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VIEWS, NEWS AND INTERVIEWS.

"You often read and hear of people losing or being robbed of valuable packages," remarked Cyrus O. Baker, Jr., the Newark platinum magnate. "Now, in my business, circumstances often compel me to carry about with me a package of refined platinum, small in bulk, but worth, sometimes, $300 or $400. When I lay the package down on a desk or counter (no, never on a bar) I always keep some portion of my body in contact with it. Sometimes I keep my elbow touching it, or my arm, or my hand, so that if anything or anybody disturbs the package my attention is immediately attracted. There is considerable platinum used for contact points on electrical devices, but it's equally important for me to keep in contact with my package of platinum. Now, if you'll come into Nelson's I'll show you just how I do this when I lay my package on a ba—counter, I mean."

It is said that John E. Hudson, president of the American Bell Telephone Company, is one of the best Greek scholars in the United States.

In speaking of the recent annual clam-bake of the American Electrical Works, the London *Electrical Review* says that "there was altogether a party of nearly 200 guests who enjoyed an excellent feast of clam-bakes." Shades of the soft-shell! A "feast" of clam-bakes! Isn't one at a time enough?

Booths are to be erected in the public squares of Copenhagen, Denmark, containing public telephones, conveniences for writing and an office for receiving letters, besides the usual newspaper and bootblack stands.

The telephone line between Copenhagen and Berlin, which it was expected would have been in full working order this Fall, will hardly be open to the public before early in the new year. This new link in the international telephonic system will connect the north of Sweden indirectly with Southern Europe, and will afford ample scope for interesting tests, apart from being of great practical importance.

Threshing grain by electric transmission of power is at present being carried on with very satisfactory results at Mjölby in Sweden. The electricity is conveyed a considerable distance from the main cable to a motor in the immediate vicinity of the thresher.

Portable batteries of chloride accumulators were used in reporting the yacht races from Atlantic Highlands by the Western Union Telegraph Company, operating the Edison phonoplex, and from the Highlands of Navesink by the Postal Telegraph Cable Company, operating quadruplex locals.

A farmer near Frankfort, Neb., aims to furnish the town with electric light generated from the power of his artesian well in process of boring.

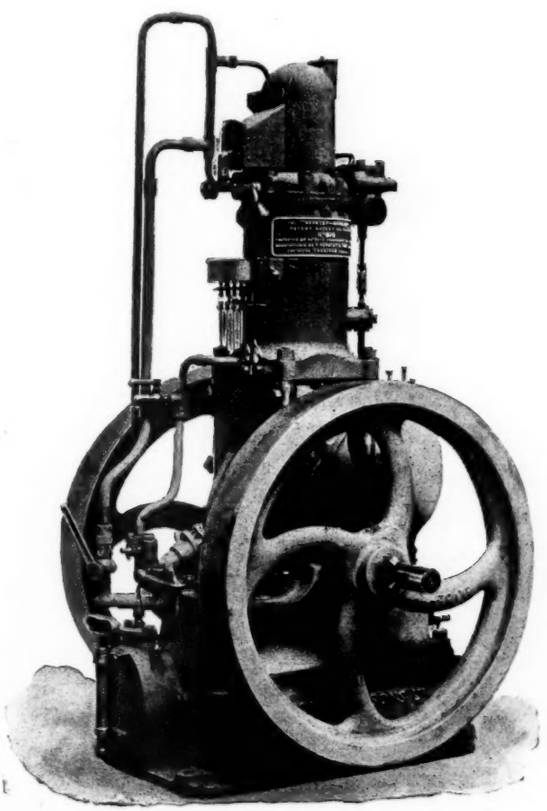

Fig. 1.—Vertical Type of Hornsby-Akroyd Oil Engine.

Too Little Capital—Too Many Patents.

[*From the Penn Yan, N. Y., Express.*]

Cheaper telephone service is in prospect. A company, consisting of the Rockfellers, George M. Pullman, and other multi-millionaires, with a capital of $250,000,000, has been started in opposition to the Bell company. The new company holds three valuable patents.

The Hornsby-Akroyd Oil Engine.

The De La Vergne Refrigerating Machine Company, of New York city, have added another department to their already large business and are now engaged in manufacturing what promises to be a very successful type of oil engine. After an exhaustive investigation the company decided upon the Hornsby-Akroyd oil engine as likely to be the most satisfactory of its class and they believe they have the most perfect oil engine in existence. This engine is now being manufactured in England, Germany, France, Russia and Belgium. The British Government is using over 500 horse-power of these engines for search-lights and a great many are in use in electric lighting plants abroad. In the belief that American electrical engineers and contractors will be interested, the accompanying illustrations and the following description of the Hornsby-Akroyd oil engine are presented.

The term oil engine is not infrequently used, in a very loose manner, to describe a variety of engines in connection with which oil is used as fuel. Steam engines in which steam is generated by liquid fuel are sometimes called oil engines. Gas engines, for which the gas is prepared on the spot by carburetting air with naphtha or gasoline, are also improperly called oil engines. The term is properly restricted to an engine using a heavy oil from which gas cannot be made without the application of heat.

As a thermal machine the oil engine stands about on a par with the gas engine, and both are in this respect very much superior to the steam engine. The gas engine, however, is more costly to run when illuminating gas is used, for the reason that the gas companies charge a very much higher price per thermal unit in the form of gas than the coal merchant does for the same in the form of coal. The oil engine is very much cheaper than the gas engine in running for the reason that the cost per thermal unit in the form of oil is very much less than the cost of the same in illuminating gas.

The oil engine of the present day will convert into work 20 per cent of the heat and use somewhat less than one pound of oil per indicated horse-power. The chief practical objections to the gas and the oil engines are the necessity of igniting the charge.

The ingenious arrangement of Otto for transporting a flame into the body of the cylinder was in its day considered a triumph of mechanical skill. The dry heat to which the valve was subjected caused rapid attrition and required frequent attention. This was followed by what is known as tube ignition, in which the tube is maintained at a red heat by a gas jet. The tube, like an incandescent lamp, has a lifetime of a certain number of hours, and is certain to split—sometimes sooner, sometimes later. The third mode of ignition is the electric spark, for which a battery and spark coil must be kept in good running order. This, however, gives less trouble than the contact points themselves within the cylinder, which are liable to become covered with incrustation. The two systems of tube and electric ignition have each their advocates, who claim great things for them. The fact that there are innumerable patents for improving them would seem to indicate that the difficulties sought to be overcome are not entirely imaginary, of which fact no one is better aware than the user of a gas engine. It is worth while recalling the fact that Beau de Rochas, who described, even if he did not use, the four-cycle now known under the name of Otto, recommends that the compression should be carried to a point at which the explosion would be automatic. In the Hornsby-Akroyd engine we have the first example of a perfectly successful carrying out of this idea. The automatic explosion is not in itself difficult to realize. The real difficulty is in securing this explosion directly at the moment required. The introduction of valve motion for timing the explosion would naturally suggest itself, but it must be borne in mind that such valves would be subjected to a temperature considerably above red heat. The manner in which this explosion is obtained in the Hornsby-Akroyd engine is illustrated in Fig. 4. The cylinder, it will be seen, is provided with an extension communicating with the cylinder by a narrow neck. This extension is unjacketed, and forms a retort in which the oil is vaporized. Nothing but oil in the liquid form is injected into the retort and only air is drawn into the cylinder. The operation, which is perfectly clear from the cuts, is as follows:

On the outer stroke of the piston the air is drawn into the cylinder and oil is injected into the red hot retort. At the end of the stroke we have, therefore, in the retort oil vapor, which is not explosive, and in the cylinder pure air which is not explosive, nor is there sufficient leakage from the one to the other to make either of the charges explosive. On the return stroke of the piston the air is forced from the cylinder through the communicating neck into the retort, and we have the conditions represented in Fig. 5. For a time the mixture of oil vapor and air is too rich for explosion, but as the piston progresses sufficient air is forced in to make the mixtures explosive.

Fig. 5 shows the mixing process, and Fig. 6, by the conventional marking, indicates that the explosion has taken place and the cylinder and retort are filled with burned gases. This automatic explosion is found to take place exactly as the piston is making the return stroke and we get diagrams similar to those in Fig. 7.

It will be noticed that the ignition takes place within the retort, the piston being protected by a layer of pure air. It is not claimed, of course, that these diagrams are exact representations of what actually takes place within the cylinder, nevertheless their substantial correctness seems to be indicated by the fact that the piston rings do not become clogged with tarry substances as is usually the case with this class of engine. This surplus air should insure complete combustion, and, that it is accomplished is evident from the analyses made by Professor Robinson. These analyses indicate that the oil is completely burned in the engine with excess of oxygen. The products of combustion consist mainly of steam

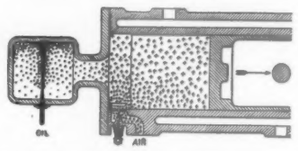

FIG. 4.—CYLINDER OF HORNSBY-AKROYD OIL ENGINE AT THE COMPLETION OF OUTWARD STROKE.

and carbonic acid diluted with nitrogen and oxygen, no traces of carbonic oxide being detected, so that the exhaust is not in any way objectionable.

The oil is sent to the retort by a small pump, which always supplies enough for the full power the engine is expected to develop. If less power is being used the speed increases a trifle and a high-speed port governor opens a by-pass and allows the surplus oil to return to the reservoir which is cast in the base plate.

At the De La Vergne Refrigerating Machine Company's Works a Hornsby-Akroyd oil engine is running some wood working machinery for the pattern shop and it is interesting to watch the promptness with which the governor adjusts the quantity of oil to the very varying power which is taken off. The power will vary from the full capacity of the engine to nothing half a dozen times within 10 minutes. When running light nearly the whole of the oil is seen to run back. The moment the circular saw is put on the overflow ceases and the engine without any laboring takes hold of the work.

The description of this engine created a considerable amount of interest at the April monthly meeting of the American Society of Mechanical Engineers, where Mr. Wildy, who represented Messrs. Richard Hornsby & Sons, Limited, in this country, had an opportunity of explaining its operation.

The Hornsby-Akroyd engine has been adapted to a variety of purposes; one of the most interesting is the portable type, the advantages of which are so obvious as to need no comment. The De La Vergne Refrigerating Machine Company has created a special oil engine department under the management of Mr. George Richmond and expects to have ready for the market at an early date some 20 sizes of these engines, up to 40 horsepower.

They claim a real advantage in that each size and type of engine has been thoroughly tested and approved by the original builders before being put on the market so that there is no question of experiment.

Messrs. Richard Hornsby & Sons, Limited, thoroughly test every engine before it leaves their works, and no new type is allowed to leave until perfect in every respect. They claim the unusual record of never having an engine returned on their hands. The same conservative policy will be pursued by the De La Vergne Refrigerating Machine Company.

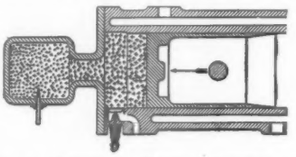

FIG. 5.—SHOWING MIXING PROCESS IN CYLINDER.

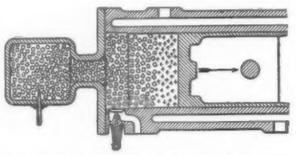

FIG. 6.—CYLINDER AFTER EXPLOSION HAS OCCURRED.

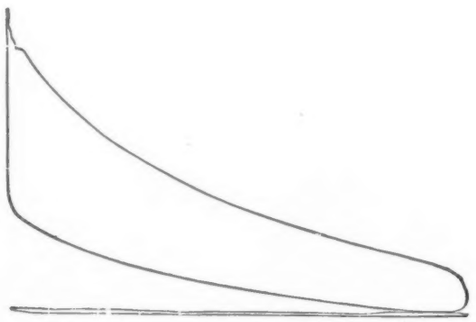

FIG. 7.—DIAGRAM TAKEN AFTER EXPLOSION AS PISTON MAKES RETURN STROKE.

Niagara Falls Power.

It now looks quite probable that the Carborundum Works at Niagara Falls, N. Y., a concern which will use a large block of Niagara electric power, will start up the latter part of this week, or very soon thereafter. Practically all of the machinery has arrived and is in position and the final touches are all that yet remain. When power is sent to this new concern and also to the Buffalo & Niagara Falls electric road and the local street railroad, about all of the 10,000 horse-power of the two dynamos now up in the Niagara Power Company's plant will be in use. The third dynamo has been built and tested at the Westinghouse works in Pittsburgh and it is understood the parts will be shipped to the Falls in a very short time. The setting up of this dynamo will not take nearly as much time as that given each of its predecessors.

The Hoosac Valley Street Railroad Company has made an arrangement with the North Adams, Mass., Gas and Electric Light Company to furnish power for the cars running on the line between North Adams and Williamstown. The company will put in new generators for the purpose.

An Early and Interesting Portable Electric Lighting Plant in New York City.

TO THE EDITOR OF ELECTRICAL REVIEW:

My attention is called to the portable electric lighting plants furnished by Mr. Thos. H. Lewis for the Buffalo Bill Wild West Company, which are of most excellent design.

It may be of interest to recall to mind a plant of somewhat similar character, which I believe was the first portable electric light plant, and this plant was successfully used during the celebrated J. G. Blaine campaign in an important parade, about October 25, 1884.

This plant consisted of a high-speed engine belted to an Edison bipolar dynamo, both mounted upon a large truck drawn by six of the largest horses in New York city. Steam was derived from the boiler of a steam fire engine, securely attached to the rear of the truck, and connection made to the boiler by a steam hose.

The water supply consisted of two street-sprinkling carts, with hose connection to boiler feed pump.

Four hundred incandescent lamps of 16 candle-power were supplied with current from this plant.

Each lamp was fitted to the helmet of the individual men forming an electric light brigade.

Six lamps were supplied to six mounted men in the front rank, and a 100 candle-power lamp on staff to E. H. Johnson, the captain. Eighteen lamps were used on the horses, three per horse.

The brigade marched from the Edison Machine Works, then located on Goerck street, to Madison avenue; up Madison avenue to Fiftieth street, thence down Fifth avenue to Washington Square, where the brigade was dismissed.

Electric lights were successfully supplied during the line of march.

The entire plant and equipment were hastily designed and put together in five days under the personal supervision of the writer.

Truly yours,

J. H. VAIL.

New York, September 14, 1895.

Union Traction Company of Philadelphia.

The new Union Traction Company of Philadelphia was formally organized on September 17 at a meeting held at the office of the People's Traction Company, by electing John Lowber Welsh president and Charles O. Kruger secretary and treasurer. The board of directors elected is as follows: P. A. B. Widener, William L. Elkins, James McManes, Thomas Dolan, John Lowber Welsh, William H. Shelmerdine, Caleb F. Fox, Jeremiah J. Sullivan, Alexander M. Fox and Alfred C. Smith. It was decided to increase the capital stock from $100,000 to $30,000,000. The question of other officers was not taken up at the meeting. There will probably be only one vice-president and a general manager. No fancy salaries will be paid to any officer.

NEW YORK STREET RAILWAY ASSOCIATION.

The Thirteenth Annual Meeting Held at Albany, September 17.

LARGE ATTENDANCE AND AN UNUSUALLY ANIMATED AND INTERESTING MEETING—MANY BRIEF AND POINTED PAPERS PRESENTED AND DISCUSSED—WILL MEET IN BINGHAMTON NEXT YEAR—G. TRACY ROGERS, RE-ELECTED PRESIDENT.

The Street Railway Association of the State of New York held its thirteenth annual convention in the rooms of the Young Men's Christian Association, at Albany, on Tuesday of last week. President G. Tracy Rogers called the meeting to order at 10.30 A. M., and Mr. J. P. E. Clark, of Binghamton, was elected temporary secretary. After roll-call and approval of the minutes of the last convention, President Rogers delivered his annual address as follows:

In the name of the Street Railway Association of the State of New York, I extend to each and every one of you an earnest welcome. Many of us have met before in this, the capital of our State, and the third oldest city of our Union, but under different circumstances than surround us to-day.

We miss from our number one familiar face. An All Wise Power has seen fit to remove from our midst our late respected secretary and treasurer, Mr. William J. Richardson. Mr. Richardson's connection with the street railroad business dates from 1876. He was our secretary and treasurer for a number of years. The excellent results attained by this organization are largely due to his executive ability and the interest and enthusiasm which he manifested in conducting the affairs of the association.

It is a matter of congratulation to us that the affairs of the association are in a healthy and prosperous condition. Many new roads have joined during the past year and we have reason to believe that others will follow their example during the ensuing year.

The year that has passed since our last annual convention has been one of no unusual events in the street railway world. There have been no radical changes or startling developments in electric railway machinery or appliances, but from a general review we note the steady advance of the past year and the many opportunities for the future which present themselves for our careful consideration.

We have been treated fairly by the legislature of our State. The men elected to make our laws have been, as a rule, desirous of subserving their constituents, and their anxiety to do so has, in some instances, made them over zealous. Many bills were introduced last year, some of them, we hope, with the best of intentions; but had they become laws, the general public, as well as ourselves, would have suffered. The committees, however, were composed of men of ability and good judgment, and they have been ready to listen to our arguments and to legislate for the greatest good of the greatest number.

The result of the year's experience shows a demand for better roadbeds and overhead construction, heavier rails, more ties, better ballasting, lighter motors, better machines and more conservative financiering.

I have the honor of being connected with the first street railroad in this State to adopt electricity as a motive power. We, who entered early in the street railroad era of rapid transit, are familiar with the skepticism and prophecies of failure which assailed us on every side. To return to-day to the one-horse, bob-tail car, with its cow-boy driver, who gave the impression that he was president, manager and board of directors, all in one, would not be tolerated by the public.

A great deal has been said and written regarding the substitution of electricity for steam for through traffic, and some of these articles have been severely criticised. The fact that electric traction is being considered by steam railroad people makes it a subject of general interest. They may adopt electricity on some of their suburban lines to protect their local travel, which we have taken from them whenever and wherever we have gone after it, but the results cannot materially effect the interests of street railways. We carry our patrons to their door steps, the public streets are our depots, we have no expensive stations to maintain, our traffic is more certain, less affected by business depressions and more capable of development than that of the steam railroad. These are advantages that the steam railroads are unable to overcome, and together with the paralleling of steam railroads by electric railways have forced a number of railroad companies into purchasing electric lines, and there is evidence of increased activity in that direction.

The adoption of an electric motor in Chicago to propel a cable road; the Westinghouse-Baldwin combine; the 90-ton freight engine on the Baltimore & Ohio road; the building of the electric railway at Nantasket Beach by the New York, New Haven & Hartford Railroad Company, as a part of their system over which electric cars and locomotives are run intermingled, and the electrical construction of the Mount Holly Branch of the Pennsylvania Railroad, all point to an endorsement of electricity as a motive power.

An experiment is now in progress in New York with power from conductors from an underground conduit, the results of which will be watched with great interest, as it may be the beginning of a new regime in street railroad work in large cities. The results, however, can have no effect in smaller cities on account of the cost.

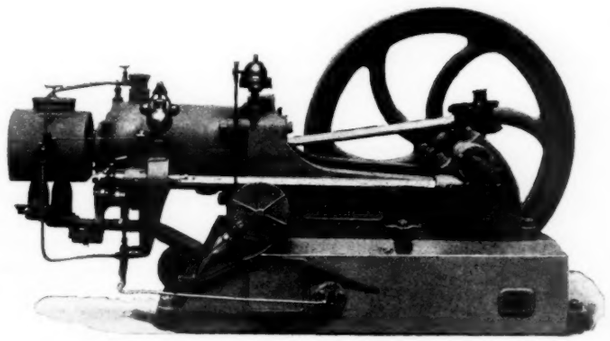

FIG. 2.—HORIZONTAL TYPE OF HORNSBY-AKROYD OIL ENGINE.

We now have in this State about 1,400 miles of track and an investment of upwards of $200,000,000. We carry every year seven times the population of the entire United States and over one-third the population of the entire world—over 500,000,000 passengers annually—while the steam roads carry but 160,000,000. The gross receipts of this street railroad traffic are about $25,000,000.

The best and most reliable financial papers now seek and publish such statistics as are attainable regarding street railways. The financial world demands this information and we are compelled to furnish the figures, favorable or unfavorable. Street railroad securities, as permanent investments, are in better favor than ever before.

The consolidation for the purpose of controlling all the street railroads in any one city and the rapid extension of cable and electric lines, both urban and suburban, have attracted the attention of financiers and investors, and large sums of money have been invested, both by local and foreign capitalists. And here I would suggest the importance and wisdom on the part of any road of placing its securities with the local investor, if possible, for reasons too obvious to mention.

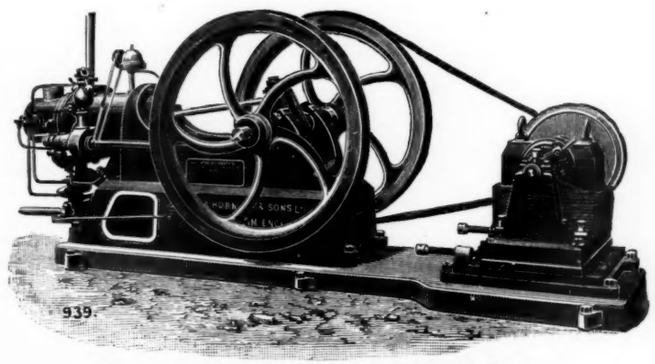

FIG. 3.—HORNSBY-AKROYD OIL ENGINE DRIVING DYNAMO.

The cost incident upon the change from animal power to cable or electric was staggering to the investor. The large electric companies came to the rescue in many instances, after gathering statistics of operations and increased receipts caused by the adoption of rapid transit and ascertaining the ability to earn more than enough to pay the interest on the cost of the change. Such information unfortunately invited speculating capitalists, who, in many instances, took advantage of the additional profit.

Over-capitalization, which has been prevalent in years past, is gradually disappearing by reason of foreclosure of mortgages and a general desire for conservatism on the part of financial people interested. In a growing city, with a sound franchise, reasonable capitalization and a well installed system for which too much has not been paid, the securities should and do commend themselves to the conservative investor.

The fields which are rapidly opening and which invite our attention are numerous and I shall call your attention to but a few. The United States Government is asking us to carry its mail; society has popularized us with her trolley parties; the express companies are negotiating with us to handle their freight; the merchants wish us to carry their goods, the farmer his milk and farm produce; and we are asked to arrange for funeral trains to the cemeteries. We are to-day closer to the public than ever before. Many, if not all of us, have learned to appreciate the fact that the public is not to be beaten and that we must conform to their wishes. The manager who meets with fairness and justice the demands of the public, and who trains his help to be gentlemanly and courteous to all, not only increases the receipts, but makes friends for his road of the riding public, the city officials and the press. I claim that the best fender on the front of our cars is a clear-headed, careful man of good judgment to handle the brake and motor.

The street railway now demands in every department the best ability that can be secured for it. Too much care cannot be exercised in selecting men to manage each department as well as to operate the road. This, in my opinion, is the one principle underlying the success of a street railroad as well as of any other business enterprise.

Competition and recent inventions have leveled the price of nearly all electrical apparatus and supplies to a commercial trade basis. Many of us can repair, and in most cases replace, a large percentage of our equipment in our own complete machine shops.

The present demand is for a lighter motor and a flexible suspension of the motor to avoid pounding of the joints. I believe this can be obtained and am pleased to learn that some of the companies are working in this direction. There is still work for the inventor. The extension of our roads into the country and the connection of a number of roads to form a large system brings up the question of potential and feeders. We may look for some valuable experiments in the use of the alternating current on street railway lines. This, in my opinion, is one of the most, if not the most, important and interesting subject that confronts us at the present time.

Many attempts have been made to produce power from compressed air, gases and numerous other agencies,

(Continued on page 178.)

A CENTRAL STATION IN MINING WORK.

BY TIMOTHY W. SPRAGUE IN THE "ENGINEERING AND MINING JOURNAL."

The establishment of a central station from which to distribute electrical energy to two or more adjoining mines has long been considered an arrangement sure to show economy over the operation of several smaller stations, and thus to bring the advantages of electric power within the means of operators who could pay a fair rental for current but who could not readily afford the investment required for the installation of a complete independent plant. Concentration of steam plant under one roof means more economical operation in every way, besides giving a chance to select a site better suited to its purpose than could be found for several smaller plants. The first practical example of this plan on a large scale in coal mining has recently been put in operation at Scott Haven, Pa. The plant is owned by the Youghiogheny River Coal Company, which also owns all the mines supplied; but although these are all under one management, they are more widely separated in location than would be the case in many coal fields where mines of separate management could be as readily supplied from a central plant. The installation is interesting also on account of the varied uses to which the electric current is put.

The accompanying map will show the extent of the workings supplied from the main station at Scott Haven. The power house is located on the east side of the Youghiogheny River in the town of Scott Haven. From it all circuits for No. 1 mine, including the haulage, coal-cutting, pumping and ventilating wires are run on poles direct to the mine-mouth and fan. The No. 4, Southwest and Pacific mines are all on the west side of the river, and the power for them is carried across in submarine cables of special manufacture. The apparatus at present in use and the distances of transmission are as follows:

At No. 1 mine, as shown on the map, at a distance of approximately 900 feet from the power house is a Capell exhaust fan, eight feet by three feet six inches, running at a normal speed of 208 revolutions per minute. It is belted from a 25 horse-power multipolar motor running at 650 revolutions. It was feared that this motor might not be able to take care of this load, but it is doing its work satisfactorily, and the fan, which is an English type, is furnishing more than the required air for ventilation, running at 120 revolutions less than its normal speed. The return from the fan is grounded with the haulage circuit.

The coal-cutting is confined at present to No. 1 mine, where at a distance of from 7,000 to 9,000 feet from the power house are five Jeffrey chain type coal under-cutters. The field of their operations is shown on the map. The machines are of the latest type, operated by motors wound for 500 volts, and thoroughly protected from mechanical injury. The cut made is five feet nine inches under and 38 inches wide. The seam as shown by the cross-section averages about five and one-half feet, and the cut is made in the lower part very close to the underlying limestone shale. The machines are 10½ feet long and are intended to undercut, under the existing conditions, about 100 tons of screened lump coal each 24 hours, the rooms being 21 feet wide. The current for coal-cutting is carried from the power house to the center of the coal-cutting field by two No. 000 Simplex insulated wires, with the same capacity insulated return wires, making a complete metallic circuit, entirely independent of and separate from the other circuits. The machines were installed and the wiring construction for them put in by the Jeffrey Manufacturing Company.

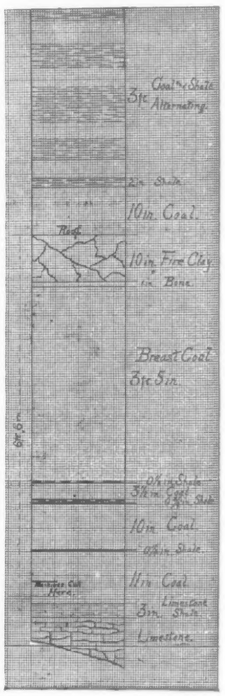

FIG. 1.—COAL SEAM IN NO. 1 MINE, YOUGHIOGHENY RIVER COAL COMPANY.

Near the center of the machine work is the present location of a portable mine pump. This is a Knowles six and one-half by eight-inch triplex pump driven by a multipolar motor of General Electric manufacture, the whole making a very useful piece of apparatus. It has a capacity of 150 gallons per minute, and is intended for rather low lifts. The pump, gearing, motor and rheostat are mounted on an iron truck made to fit the track gauge and the outfit is readily movable from place to place. The pump is run on the grounded circuit with the locomotive.

The remaining application of power in No. 1 mine is for haulage. A 2,500-pound drawbar pull locomotive of General Electric manufacture runs from the tipple to a point 6,000 feet approximately from the bank mouth. The grades along this haul vary from one per cent against loads to one-quarter per cent in their favor. The heaviest grade against the loads is near the pit mouth and is short. This locomotive, as well as the others installed, is wound for a speed of eight miles per hour, and is 43½-inch gauge. Wherever the locomotives run, 30-pound rails have been laid, and the track is in excellent condition. The regular trolley construction is used, the trolley being No. 0 copper, held by mining insulators and clamping ears. A No. 00 weatherproof wire runs from the power house to the pit mouth of No. 1 mine, where it connects with the trolley, and runs in parallel with it 3,000 feet inside as a feeder. A No. 00 bare wire taps the rails at the bank mouth, carrying the return to the power house.

Pumping is the only application of power made at present in No. 4 and Southwest mines. These mines are supplied with current through a No. 2 cable which branches from the other cables just across the river from the power house, and is carried on poles the remainder of the way. The pumps are of the same type as that in No. 1 mine, and are of 10 and seven and one-half horse-power capacity, respectively. They are operated on a grounded circuit, the rail return being tapped by aerial wires at the bank mouth for the return to the power house. The distances from the power house to the pumps are a little over 8,000 feet each.

In the Pacific mine there are installed a 2,500-pound drawbar pull locomotive, and a six and one-half by eight-inch portable pump with a seven and one-half horse-power multipolar motor; it is proposed soon to add a 30 horse-power motor for ventilating purposes. The bank mouth at Pacific is over 9,000 feet from the power house, and the locomotive haul extends over 5,000 feet underground. The pump is located nearly 2,000 feet from the end of the haulage line, and it is proposed to put the fan about 1,000 feet beyond the pump. Two No. 00 bare wires carry current for the haulage circuit, and a No. 0000 wire, also bare, makes a metallic circuit from the submarine cable to the pump. This circuit is grounded, as are the other pump circuits, only at this point in the return. The No. 00 feeders for the locomotive are run inside in parallel with the trolley for 1,000 feet, and one of them continues on 2,000 feet further. The bonding wires are everywhere No. 0, bare copper, tinned. The grades in the Pacific haul are shown on the map. In the beginning of the haul there is a one-half per cent grade in favor of the loads for 1,200 feet, then follows 1,700 feet of a less grade, then 900 feet of level track. The last 1,400 feet of the haul has a grade slightly over one per cent against the loads.

No. 5 mine bank mouth is 13,800 feet from the power house and the points inside where it is proposed to install apparatus will bring the total distance of transmission up to over three miles.

The novelty of submarine transmission for mining work makes the cables used of interest. They are specially insulated and armored cables made by the General Electric Company. The returns from all the circuits crossing the river are bunched and carried across in one cable. As already noted the pumping and fan circuits are metallic from the end of the cable to the motors, so that if at any time it seems advisable to make them entirely independent of the grounded cable return, it will be necessary simply to change the connections on the west side of the river and run independent return cables across to the power house. The common return now in use is made up of 37 strands of No. 10 wire, giving it a carrying capacity of 388,000 circular mils. Around this wire is first a covering of pure rubber, next a layer of lead, then a covering of tar and asphaltum, bound with iron armor wires. Outside of these is a second covering of tar and asphaltum, and iron armor completes the protection. A similar cable of the capacity of a No. 0000 wire is the positive lead for the haulage line of the Pacific mine, and a duplicate forms the positive for the fan and pump circuit. The positive for No. 4 and Southwest mines is a similar cable of the capacity of a No. 2 wire. A cable house has been built on each bank of the river where the cables cross and between these houses the cables are buried. The problem of handling these extremely heavy cables and laying them across stream was but one of many unusual conditions which were successfully met by Mr. J. N. Bulkley, the consulting engineer who had supervision of the entire installation.

The Youghiogheny company has made use of a portion of a building which was formerly a bonded warehouse and which now makes an excellent power-house, while also containing a store, offices, etc. This building is 74 feet wide and the boiler house, which is an addition to the original building, occupies the entire width and is 33 feet in its other dimension. It contains three 66-inch by 18-foot tubular boilers made by the Union Iron Works, of Erie, Pa., each containing 58 tubes four inches in diameter. They are set with half-arch fronts and brick walls. Each boiler is independent and provided with its own 60-foot stack, 30 inches in diameter. Water supply is furnished from a well 130 feet deep, from which it is raised by a Downie deep-well pump. What is not needed for immediate use is pumped into storage tanks. The boilers are fed by a 10x6x10-inch Buffalo pump and three Metropolitan No. 10 injectors. A Hardwick feed-water heater serves for all the boilers. Owing to the quality of the water some soda ash is dissolved in the feed water, this being accomplished in a barrel sunk beneath the floor and so piped that the injector suctions can be connected to it and in this way the soda ash solution fed from time to time as required. Coal is delivered at the boilers from a

chute without any expense of handling.

Separated from the boiler house by a brick wall is the engine room, which is 74 feet long by about 50 feet wide. It contains three McEwen automatic engines, each 15 inches by 16 inches with 72-inch fly-wheels, running at 240 revolutions. They carry from 80 to 90 pounds steam pressure and are each belted to a multipolar generator of 100 kilowatts capacity. Fourteen-inch double leather belts are used, the distance from center to center being 24 feet six inches. The generators are General Electric type wound for 500 volts and over-compounded for 10 per cent loss on the line. They run at 560 revolutions and have a normal output of 182 amperes. Both the engines and generators are set on very substantial brick foundations, as there is a cellar beneath the engine-room floor; the foundations go down to the solid bottom, making them nearly 15 feet deep. Those for the engines are 10 feet by 16 feet at the base, the brick being laid on 12 inches of concrete. The generator foundations are also underlaid with concrete and are 12 feet by 12 feet at the base, tapering to the top. From the generators the current is carried to the switchboard on heavily insulated cables laid on porcelain insulators under the floor.

The switchboard is a skeleton panel oak board, and is well arranged to accomplish the rather complicated work it has to do. On the generator board are three machine circuit breakers, General Electric type, below them three Weston ammeters, below these three main double-pole, double throw switches, and at the bottom, the three field rheostats. The voltmeter, Weston round pattern, is carried on a swinging bracket at the side and top. Two sets of 'bus bars are run on the back of the board, one for the metallic and one for the grounded circuits. The arrangement of switches allows either of the machines to be run on either of these circuits, and by means of equalizer connections, any two or all three of the machines may be run in multiple on either grounded or metallic circuit work. This arrangement permits the most economical running of the station, as the work of the mine varies, and also insures the plant against any serious shut down. The feeder panel carries individual circuit breakers for the No. 1 haulage circuit, for the Pacific haulage circuit and for the No. 1 coal cutting circuit. Below these are double-pole switches controlling the two pump circuits, the fan circuit and the coal cutters, three of them protected by fuses. Below the distribution switches is a large double-pole switch by which the metallic and grounded 'bus bars may be thrown in multiple. As already explained, the coal cutting is the only circuit which is at present metallic, the other switches and circuit breakers being connected to the grounded bars. Lightning arresters placed under the floor protect the generators. All the switchboard connections are made with No. 00 hand drawn bare copper wire. This plant was started early in July, and like all new plants, is not yet working up to its capacity, but the coal cutters are doing satisfactory work, which is also true of the locomotives. By the latter 18 mules and several drivers have been displaced. The four pumps with three men to look after them are accomplishing what it was formerly difficult to do with 10 men, four mules, two steam boilers and two steam pumps.

A seven and one-half horse-power motor is being installed in the new steel tipple at No. 1 mine, where it operates revolving screens, and also runs an emery wheel for sharpening bits, etc. A small iron building has been erected near the tipple, which serves for a machine shop and locomotive house, with pit, etc.

This plant is not far from Pittsburgh, and is also near the Essen plant at Hazletine; and these two plants show the development of electricity in mining very satisfactorily. Mr. M. H. Taylor, of Erie, Pa., is president of the Youghiogheny River Coal Company; W. S. Gresley, general manager and consulting engineer; J. F. Hoseck, superintendent; J. S. Van Kirk, engineer, and J. H. Keller, is in charge of the electrical plant. Mr. J. N. Bulkley, acted as consulting engineer with Mr. Gresley, and Mr. John E. Free had charge of the installation work. Acknowledgments are due all these gentlemen for courtesies extended and for maps and data furnished.

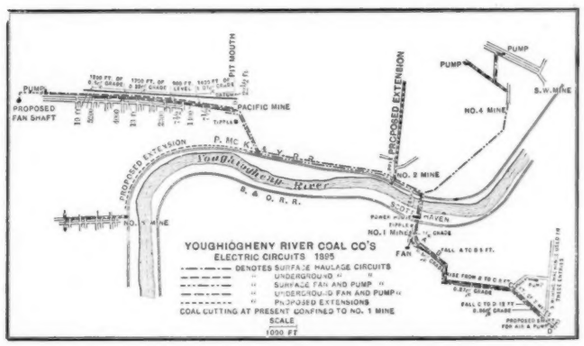

FIG. 2.—MAP SHOWING ELECTRIC CIRCUITS OF THE YOUGHIOGHENY RIVER COAL COMPANY.

Sale of the Schuyler Plant.

Unless previously disposed of at private sale, the entire manufacturing plant of the Schuyler Electric Company at Middletown, Conn., will be sold at public auction on the premises at noon on October 15.

President Dustin thinks that the outlook is good for the electrical business, and he is in hopes to effect a reorganization of the company, as soon as the legal entanglement which necessitates the sale is unraveled. Under his splendid management the Schuyler company made, during the five years from 1889 to 1894, gross profits of $377,000 and net profits of $220,000.

Cincinnati will soon have fenders on the street cars.

Pintsch Light for Electric Cars.

TO THE EDITOR OF ELECTRICAL REVIEW:

It is now almost a year since the Columbus Central Railway Company, of Columbus, O., under the advice of its engineers, Barry and McTighe, of New York, took the rather bold step of lighting its trolley cars with gas. A regular Pintsch gas works was erected, and as the cars were built (40 in all up to date, and more coming), they were equipped with the standard Pintsch tanks, piping, valves and burners, eight of the latter in each car. The system of lighting has given great satisfaction, the light being white, plentiful, soft and perfectly uniform, no quiver or change occurring at any time. One charging occupies about two minutes and lasts an average of 20 hours' lighting.

The writer is credibly informed that the wear and tear has been only nominal, and repairs due to ordinary use practically nothing. A charging valve got bruised a little by coming in contact with a foolish cow one night. A little solder fixed the valve, but the cow could have been utilized only by a process of canning and soldering not applicable on the spot. However, the cow was cured—of the habit of crossing the tracks at night.

Nothing could operate more satisfactorily in illuminating trolley cars. The ordinary electric lamp is a dismal sort of thing, dependent, as it is, on the electric pressure, which continually changes even on the best of systems. And when a circuit breaker blows at the station, or the trolley slips from its wire, or a lot of other possible accidents happen, the light is gone entirely. This one feature of constant and unfailing illumination when Pintsch gas is used, is alone conclusive evidence of its special adaptability to trolley cars.

A very striking illustration of this occurred recently on the suburban line of the Columbus Central Railway. A very extensive property was bought by the company and transformed into a fine park, with lake, pavilion, scenic railway, electric waterworks, and other sources of pleasure and recreation. Though 10 miles from the center of the city, Minerva Park sprung into instant popularity, and the people thronged the cars. One evening a shower crossed the line between the park and the power station, a distance of eight miles. At the time there were 12 loaded cars on the section, every car filled to the limit with good-natured, pleasure-seeking crowds. Suddenly a lightning stroke somehow got to work on one car whose controller happened to be on the second notch, and as usual the unexpected happened. The connections were fused and grounded but without injuring either of the motors, and curiously the equipment was apparently in good shape on the first notch.

The moment this accident happened, of course the "automatics" at the power station blew and all cars on the section stopped. In a few seconds current was restored, all cars started smoothly, but the instant the controller of the damaged equipment got on the second notch, away went everything again. The station attendants were kept jumping at the switchboard till they gave it up, to await discovery and remedy of the trouble on the road. The superintendent tore along the stretch of road examining each car, and finally after a lapse of over an hour the bug was found and the car sent home for repair. With the electric system of lighting there would have been almost a thousand people held virtually in darkness, away out in the country, women and children would have become nervous and hysterical, and everybody would have become uncomfortable and dissatisfied. But those cars were all equipped with Pintsch gas, and they remained brilliantly illuminated during the whole period of delay, and the passengers preserved their tempers, whiling away the time with songs and jests, and the whole thing passed off without one word of complaint being heard. It was a remarkable illustration of one of the chief advantages of the gas system, and the Columbus Central's choice was fully vindicated. J.

The Young Men's Institute.

There is an institution at Nos. 222 and 224 Bowery, New York city, which is a fine example of practical Christianity and for the past 10 years has been doing a most commendable work. It is the Young Men's Institute of the Young Men's Christian Association and is much like the Polytechnic Christian Institute of London. A prominent part of its work is the educational department. Last season 453 young men between the ages of 17 and 35 were enrolled in the evening educational classes in the following subjects: Bookkeeping, penmanship, arithmetic, English grammar, shorthand, typewriting, mechanical, architectural and free-hand drawing, carriage drafting, steam engineering, electricity, vocal music. Most of these pupils come from the shops, offices and factories of the city. The teachers are men of experience and ability and the courses of instruction are planned to directly help the young men in the work in which they are engaged. Besides the classes there is an excellent circulating library, a large reading room, and every Tuesday night a scientific lecture or a musical and literary concert is given in the large hall. There are also bowling alleys, a well equipped gymnasium and shower and spray baths.

The fees charged are only nominal, varying from $4 to $7.50 per year, according to the number of privileges taken by the member. Improvements have been made in the building during the past Summer, and the public is invited to a grand opening on Tuesday evening, October 1, 1895.

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SPECIAL NOTICE TO ADVERTISERS.

***CHANGES** for advertisements must be in this office by Friday noon for the following week's issue. NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.*

NEW YORK, SEPT. 25, 1895.

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The convention of the Street Railway Association of the State of New York, held at Albany last week, was one of the most successful in the history of the organization. A number of interesting papers were read which will appear, owing to lack of space this week, in later issues of the ELECTRICAL REVIEW.

The continually improving business situation is a matter of sincere self-congratulation to manufacturers. Iron and copper are unprecedentedly high and the lines of manufacture dependent upon these staples are feeling the rise in prices proportionately. The outlook for supplying the central station trade with goods for the Winter business is most satisfactory. The demand for incandescent lamps, arc lamps and carbons is good and promises to be better. The makers of these articles are filling good orders now and are reaching out for more.

We understand that certain arrangements are being perfected between the principal incandescent lamp manufacturing companies of the country which, it is hoped, will result in putting the business more securely on its feet than has ever been the case before. The prices for incandescent lamps are absurdly low, and it is certainly time to adopt measures by which the price can be raised so as to afford the manufacturer a living profit. We understand that the arrangements referred to are designed to accomplish this result as well as other things.

THE ATLANTA EXPOSITION.

The Cotton States and International Exposition was opened with impressive and appropriate ceremonies at Atlanta, Ga., on September 18. This exhibition has a definite and laudable purpose in view, which, it may safely be said, has already been accomplished. It is to call the attention of the world to the New South and its industrial advantages. No one who reads newspapers or magazines was ignorant of the exposition and its objects long before the formal opening. The press of the country unanimously assisted in advertising thoroughly the exposition and its objects, and it was just this sort of publicity that the New South needed. We look to see wonderful advances industrially and commercially in the Southern States from now on. We congratulate the progressive men who planned and prepared this exposition, and hope for it the complete success which they surely deserve.

WALL STREET AND THE ELECTRICAL STOCK MARKET.

The stock market this week advanced throughout. The complete recovery in confidence after its severe shock of a week ago was almost phenomenal. This demonstrates that the scare arising from heavy gold exports was not well founded. The shipments this week were $1,800,000. The bulk of this amount went on Tuesday. After that day, sterling exchange, under a rather free offering of commercial security, produce and cotton bills declined sharply, quieting fears of a heavy movement next week to a considerable extent. These were practically eliminated on Saturday when it became known that arrangements had been perfected to restore the gold reserve. The money market has assumed much more satisfactory shape from a speculative standpoint. Rates on call Tuesday advanced to 3 per cent, the highest in two years. This was caused by the scarcity of funds in this center, and a steady withdrawal by the South and West of funds for crop moving purposes. The high rate immediately resulted in the placing of a large sterling loan which checked to a considerable degree the call for remittances. During the early part of the week the Industrials enjoyed one of their old-time booms under lead of Chicago Gas and Tobacco. Up to Thursday night every stock on the list was considerably higher than on Monday. On Friday there was a reaction on profit taking. Saturday the advance became general. Next week, if the gold movement is small or nil, as now seems likely, higher prices will result. Dun and Bradstreet's agree that the volume of business is comparatively large and that the recent advances in the prices of commodities have been well maintained. The bank clearances for the week show an increase of 20.8 per cent over the corresponding period in 1894. Railroad earnings for the most part have been favorable.

A feature of more than ordinary interest in the electrical securities was an advance in General Electric from 36½ on Monday to 40 on Saturday, on quite liberal buying. A prominent bull trader has taken hold of the stock, apparently with the consent of insiders. This leads to the belief that the long expected upward swing in this property has been inaugurated. The sharp movement in the stock this time is accounted for with the statement that the buying is based upon the certainty that the company will secure the Manhattan contract. This, it is claimed, will not be placed in small sections, but will be given out at once. I asserted, on excellent authority, in this column some weeks ago that when the contract was placed it would come piecemeal, so as to enable the company to wear out its rolling stock, thereby allowing it to equip the lines at the minimum cost. There is only one thing to prevent this policy, viz., the necessity of taking prompt action to stop the inroads made upon Manhattan earnings by the Metropolitan

Traction Company. These have been serious for a year or more, leaving the company barely six per cent net with which to keep up its dividends. When the cable lines under construction are in operation, Manhattan will be a still greater sufferer.

Edison Electric Illuminating of New York was not quoted during the week. Its old 5 per cent bonds sold at 107½ @ 108. The Illuminating Company of Brooklyn has declared a quarterly dividend of 1½ per cent, payable October 15. Books close September 30 and reopen October 16.

Westinghouse has declared its quarterly dividend of 1¾ per cent on the preferred stock payable October 1. Books close September 21 and reopen October 2. Pittsburgh advices are to the effect that the new works of the company are now in perfect running order, and that shipments are being made at the most satisfactory rate. Designs for new trucks and electrical locomotives, jointly the product of Westinghouse and the Baldwin company, have been completed and work has been begun.

American Bell Telephone Company this week declared the regular quarterly dividend of 3 per cent payable October 15 to stock of record September 30. No extra dividend was declared.

On the Boston Exchange, Bell Telephone was exceedingly quiet, despite which fact it gained 2 per cent. General Electric preferred was featureless at 69 bid and 71 asked. Electric Storage Battery was quite active, advancing to 46 at the close. On Tuesday it slumped to 39½, from an opening of 44. The recovery was speedy. New England Telephone closed the week at 88 without net change. Westinghouse securities were steady at 35½ @ 36½ for the common and 55 @ 55½ for the preferred.

BAIN.

New York, Sept. 21, 1895.

PERSONAL.

Allen R. Foote has been appointed editor of the *American Exporter*.

President Samuel Insull, of the Chicago Edison company, is visiting New York.

Mr. E. E. Cary, of the Beacon Lamp Company, Boston, visited New York early this week and made a welcome call at the ELECTRICAL REVIEW office.

Thomas A. Edison's daughter, Miss Marion Edison, is engaged to be married to Lieutenant Oeser, of Chemnitz. Miss Edison has been in Germany for several years.

Frank Judson Pope, who was graduated from Columbia College in the class of '95, has entered journalism on the staff of the New York *Evening Sun*. He is a son of Mr. Ralph W. Pope, the able and popular secretary of the American Institute of Electrical Engineers.

Mr. H. T. Richards, who was for five years advertising manager of the ELECTRICAL REVIEW and more recently connected with the *Dry Goods Economist*, has joined the staff of the Safety Insulated Wire and Cable Company, of New York city. Mr. Richards has an extensive acquaintance among electrical men in all parts of the country, and will be a thoroughly wide-awake and efficient aid to General Manager Leonard F. Requa in the disposition of the Safety products, which have a well-earned reputation for quality.

OUR BOSTON LETTER.

Mr. C. O. Baker was in town for a day this week, and, as usual, full of business. Mr. Baker made his headquarters at Young's Hotel, and used up his limited time in booking orders, a very satisfactory way to spend it. Platinum, so Mr. Baker states, has advanced very materially in price. Let us hope lamps will see the raise and go one better. There is plenty of room for it, and the increased cost of material is a basis for asking better prices, which manufacturers should take advantage of. It only needs a little backbone among them to put the lamp industry back where it belongs—on a paying basis.

The Dynamo Electric Maintenance Company, of this city, are gradually making themselves felt in electrical circles throughout New England, and are becoming a factor of some importance among central station men, as well as in the field of isolated plants. They have now been doing business long enough under the new management to establish confidence in the benefits they offer for the care of electrical apparatus, and also of their ability to carry out their contracts in every instance. The central stations now on their list, which comprises a large number, speak very highly of their system of inspection and repair, and are beginning to realize the saving it is to them, both in expense and in the efficiency of their apparatus. In the matter of isolated plants, their service is invaluable, and as a result they already have contracts with some of the largest estates in Boston and vicinity, and are daily adding to the number. It will be well worth the while of parties having an electric light or power plant on their hands to consult them on the care of it.

The annual convention of the National Electro-Therapeutic Society was held in this city on Wednesday and Thursday of this week, the headquarters being at the Hotel Vendome, and those interested state that they are more than satisfied with the success of the meeting. Topics of great interest to the medical profession, relating to the various uses of electricity in medicine and surgery, were brought up and freely discussed, many new points in electro-surgery and gynecology and the treatment of diseases of the ear, eye and throat being brought out. A resolution to the effect that all quackery be discountenanced by the society was adopted and that every effort should be used to keep electro-therapeutics on a strictly scientific basis. Officers for the ensuing year were elected as follows: Dr. A. P. Norton, New York, president; Dr. F. A. Gardner, Washington, 1st vice-president; Dr. Clara E. Gary, Boston, 2d vice-president; Dr. F. M. Fraser, New York, secretary; Dr. Y. Garrison, New York, treasurer. Several prominent members of the profession, both in this country and abroad, were added to the list of honorary membership and New York was selected as the place for the next annual meeting.

H. G. T.

Boston, September 21.

ITEMS OF INTEREST.

It is reported that the Russian Government will admit electrical, lighthouse and certain kinds of railway apparatus free of duty for four years from September 16.

Lake copper sold in New York city in considerable quantities at 12 cents on September 1-, and electrolytic cathodes at 11.42 cents, the highest price ever received for them.

The Eddy Electric Manufacturing Company, of Hartford, Conn., has opened a new western office at 305 Dearborn street, Chicago, in charge of Wallace & Hine, western agents.

A dispatch from Rio Janeiro to a London news agency on September 19 said that the Brazilian Government has decided that if England establishes a cable station on the Island of Trinidad the British minister at Rio Janeiro will receive his passport.

The partnership lately existing between Clift Wise and G. H. Knebel, under the firm name of Clift Wise & Co., has been dissolved by mutual consent, and Clift Wise will continue business as a contractor for electric railway construction and paving under his own name, at 408 Omaha Building, Chicago.

Cotton States and International Exposition.

In his cottage at Buzzard's Bay, at 6.56 P. M., on September 18, President Cleveland pressed his thumb on an electric button and instantly the power plant at the Cotton States and International Exposition at Atlanta, Ga., 1,000 miles away, was set in motion.

Over 100,000 people were present at the opening ceremonies of the great southern exposition. The exercises included oratory, a large military and civic parade and an electrical illumination. When the engines started, just at dusk, hundreds of arc lights flashed out on the plaza, and incandescent lights gleamed from the cornices and domes of the Woman's Building and the Government Building.

Nearly all the exhibits were in place and it is reported that the Exposition was far more complete in this respect than was the World's Fair on the opening day.

Bids for Electric Elevators.

Bids were opened on September 20 at the office of the Supervising Architect, Treasury Department, Washington, D.C., for furnishing and erecting complete, either a steam or electric passenger elevator for the United States Court House and Post Office Building at Paris, Texas. The bidders were as follows:

Otis Bros. & Company, New York, N. Y., steam, $5,575; electric, $6,550; time to complete, 60 days. Sulzer-Vogt Machine Company, Louisville, Ky., electric, $3,620; to complete in 90 days. Crane Elevator Company, Chicago, Ill., steam, $2,650; electric, $3,100; time to complete, 60 days. Standard Elevator and Manufacturing Company, Chicago, Ill., steam, $2,755; electric, $3,350; time to complete, 60 working days.

Western Electric vs. Brush.

In the suit of Western Electric Company *vs.* Brush Electric Company on patent No. 476,317, issued to C. H. Rudd, June 7, 1892, for a system of testing electric circuits, a final decree was entered September 19 by Judge Showalter of the United States Court finding the patent valid, and infringed by the Brush Electric Company. The patent in question covers a system of locating grounds and other troubles on an electric light circuit, which consists in providing an artificial circuit of high resistance at the station and adapted to be connected to a line circuit, the resistance of the artificial circuit being fixed and so apportioned between contact points that the attendant, by means of a testing set, may find the neutral point in the artificial circuit corresponding to the neutral point of the line circuit connected therewith. Claim 1 of the patent is as follows:

In an electric light system, an artificial circuit containing high resistance of invariable amount, said artificial circuit being connected with the different sides of a dynamo-machine while supplying current to a working circuit, said artificial circuit having its resistance apportioned between connecting-sockets, in combination with a testing apparatus for determining the neutral point of said artificial circuit, substantially as and for the purpose specified.

American Institute of Electrical Engineers.

The ninety-ninth meeting of the Institute will be held on Wednesday, September 25, 8 P. M., at the Hoffman House, corner Broadway and Twenty-fourth street, New York city. A paper will be presented by Mr. Charles S. Bradley, of Baltimore, on "Phasing Transformers." The paper is printed in the June and July issue of the Transactions, which will be mailed in advance, and copies will also be distributed at the meeting. Arrangements are being made for an exhibition of the apparatus in operation in the Banqueting Hall of the Hoffman House, where the meeting is to be held. At the meeting to be held October 16 a paper will be presented by Mr. Hermann Lemp, Jr., of Lynn, Mass., on the "Local Annealing of Harveyed Armor Plates."

Examination for an Electrical Inspector.

A civil service examination will be held in a few days for the position of chief inspector of electrical appliances in the Fire Alarm Telegraph Bureau of the New York City Fire Department. Full particulars and application blanks can be obtained from the New York City Civil Service Board, Lee Phillips, secretary, New Criminal Court building.

New York Electrical Society.

The opening meeting of the Society for the season 1895–96 will be held at Columbia College on Friday, September 27, at 8 P. M.

Mr. T. C. Martin, editor of *The Electrical Engineer*, will deliver a lecture entitled "Niagara on Tap." Illustrations will be given by lantern slides made from photographs taken specially for the lecture.

ELECTRIC RAILWAY NOTES.

It is possible that Keene, N. H., may have a storage battery road.

Tete-a-tete trolley cars with sofa seats built for two are the latest thing in Newark, N. J.

It is predicted that in less than three years there will not be a single cable railway in operation in New York city.

The Consolidated Traction Company, of New Jersey, will experiment with continuous rails having electrically welded joints.

The Baltimore, Middle River & Sparrows Point Railway will build a new 60x105 foot power house at Baltimore to cost $40,000.

W. P. Durham, manager of the Durham, N. C., Street Railway Company, died of paralysis of the heart, after an illness of a few hours, on September 3.

It is expected that the Atwater street power station of the Detroit Railway company will be completed about October 1. The building is 230x135 feet.

The earnings of the Philadelphia Metropolitan Traction Company for six days of September increased $19,580; Baltimore Traction Company for the same time increased $3,394.

The proposition of the Atlanta, Ga., Consolidated Street Car Company to double the fare to and from the Cotton States and International Exposition grounds has raised a storm of protests.

The electric railway company at Columbia, S. C., has decided to run its cars without conductors, depending upon the watchfulness of the motorman and the honesty of the public to collect the fares.

At special hearings before the selectmen of Georgetown, Bradford and Groveland, Mass., permission was granted the Haverhill, Georgetown & Danvers Street Railway company to locate tracks in those towns.

On the municipal street railway system in Glasgow, Scotland, every passenger is provided with a seat and the rate of fare is one cent per half mile. No advertising signs are allowed in the cars.

It is likely that the announcement will soon be authoritatively made that the motive power of the Yerkes systems of street railroads in Chicago, on the trunk lines, will be changed from cable to an underground electric system.

The Newburgh, N. Y., Electric Railway Company is independent of the city's water supply, an artesian well 150 feet deep, with a capacity of 40 gallons per minute, having been drilled on the company's property at the power house.

Trolley cars are now running from Youngstown to Girard, O., and in about a month the line between Girard and Niles will be in operation. This will give a continuous line of electric railway from Warren, O., to Haselton, O., a distance of 20 miles.

The Camden & Atlantic Railroad has decided to double track the entire 60 miles of its line between Camden and Atlantic City, N. J. This is thought to be the first step toward equipping the road with electricity, as was predicted in the ELECTRICAL REVIEW some time ago.

The street railway company of Toronto, Ont., pays the city $800 per year for each mile of track, besides 8 per cent on the first $1,000,000 of gross receipts and 20 per cent on all receipts above $3,000,000. The fare is four cents for grown persons and a half rate to all who attend school, irrespective of age.

The Railroad Commissioners of Massachusetts have issued an order making it imperative that all electrically operated street cars shall be heated by electricity; those now heated by stoves must adopt electrical heating as soon as the stoves are worn out. All new roads in Boston are required to put in electric heaters.

The managers of the Brooklyn Heights Railroad, of Brooklyn, N. Y., propose to make many improvements in the service this Winter. Many of the lines will be relaid and new rolling stock will be purchased. The cars will be heated by electricity. In a short time the company will have its new trolley party cars for Winter use in operation.

The directors of the New York and Brooklyn Bridge have instructed Chief Engineer C. C. Martin to investigate "the question of electric motive power for the propulsion and switching of the trains on the bridge," and to obtain from the various electrical companies plans and specifications. It is believed that the trustees have decided to put in some electrical system in place of the engines now in use.

Missouri now has a cross-country electric road between Carthage and Carterville, a distance of 15 miles, and the distance is covered in about an hour. The road is somewhat experimental, the country being a level prairie. If it proves a success, it will be extended into Kansas, Carterville being but 10 miles from the State line. The subject of furnishing power to threshing machines will be considered next year.

SKETCHES SHOWING SOME OF THE USES FOR INCANDESCENT LAMPS.

It is reported that the Westinghouse Electric and Manufacturing Company has completed the designs for the trucks for a new electric locomotive, and the trucks are now being built. The plan for the frame to go upon the trucks has been decided upon, and the company will push forward the construction of the complete locomotive, after which it will be thoroughly tested at East Pittsburgh on the underground circuit and on the Turtle Creek branch of the Pennsylvania Railroad, where trolley wires will be erected for the purpose.

The resignation of Major E. B. Ives as chief engineer of the Electric Traction Company, of Philadelphia, took effect on September 13. His position will be filled by A. H. Engstrom, his former assistant in the construction of the Electric Traction Company's system. Mr. Ives will superintend the construction of the new trolley line between Reading and Allentown, the contract for which was given out recently. This line is to be 36 miles in length, 22 miles of which will be built this year and the remainder in 1896. It is reported that alternating current will be used to operate the system.

The West End Street Railway Company, of Boston, is building a line on Norfolk street, in the Dorchester district, one and one-quarter miles, over which it is anticipated cars will be running by October 1. The company also contemplates the building of a line on Brighton and Commonwealth avenues to connect with the Newton boulevard. It is expected that the electric heating of the cars will give increased earnings. Three years ago the West End officials experimented with an electric heater, but it was not found practicable. The delay in equipping with suitable heating apparatus has been due solely to the desire on the part of the officials to find a practical electrical heater equal to all demands. Present contracts for electrical heating will call for the expenditure of about $50,000.

The consolidation of all but three street car lines in Pittsburgh and Allegheny City is now said to be assured. A conference was held on September 17 by Emmett C. Gibson, of Chicago, who engineered the deal; P. A. B. Widener, W. L. Elkins, the Philadelphia traction magnates; C. L. Magee, Senator William Flinn, George T. Whitney, Colonel J. W. Elkins and George C. Wilson, counsel for the Pittsburgh-Duquesne syndicate. Mr. Gibson said that the consolidation will mean the booming of Pittsburgh stocks and securities in the East. A portion of the shares and bonds of the consolidated will be sold in the East, but the control of the roads will remain in the hands of the men who now own the leading systems. The bonded debts of all the roads will be practically refunded. The total issue of bonds of the new corporation will cover the debt of each line. Mr. Gibson would give no figures, but it is understood the bond issue will be about $10,000,000. The capitalization will probably be $15,000,000.

Uses for Incandescent Lamps.

The pen and ink sketches on this page, showing in a very artistic way a number of uses for incandescent lamps, are from the new catalogue of incandescent lamps just issued by the Buckeye Electric Company, of Cleveland, Ohio. The sketches show the incandescent electric illumination of the trolley car, newel post lighting of a residence hallway, a miner's lamp, yacht lighting, a "bung-hole" lamp for examining the interior of casks or barrels and street lighting by a group of incandescent lamps on a standard. The Buckeye lamps are made to use for all these and other purposes.

LITERARY.

The prospectus of the Brooklyn, N. Y., Institute of Arts and Sciences for 1895-1896 has been issued and gives full information of the work contemplated for the ensuing season.

We have received the "Stationary Engineers' Gazetteer of Illinois" for 1895. It contains an accurate list of engineers in charge of power plants in the State and a list of engineers' supply houses. The price in cloth is $5 and in paper $2.50. It is published by the Stationary Engineers' Gazetteer Association, 159 La Salle street, Chicago.

A series of pictures in *McClure's Magazine* for October, from photographs taken for this special use, will exhibit the life-size equestrian statues of Grant and Lincoln, lately completed for the city of Brooklyn by the sculptors, O'Donovan and Eakins, through all the stages of their execution, from the first studies in wax and clay from living models, down to the final casting in bronze. A paper by Cleveland Moffett will also describe the work, from personal observation of the artists and their assistants.

"Electricity in our Homes and Workshops—A Practical Treatise on Auxiliary Electrical Apparatus," by Sydney F. Walker. Third edition, revised. Cloth, 350 pages, 143 illustrations. New York, D. Van Nostrand Company, 1895. Price, $2. Sent postage free on receipt of price by the ELECTRICAL REVIEW Publishing Company, 13 Park Row, New York.

This popular handbook is now issued in a revised edition, in which all of the matter relating to telephone apparatus has been thoroughly revised, extended and brought up to date. Small exchange plants and interior telephone systems are clearly described. The chapter headings in this valuable handbook are as follows: Glossary of terms, the electric circuit, magnetism, galvanic batteries, electric bells, electric mining signals, telephonic apparatus and dry batteries.

"Electrical Measurements—A Laboratory Manual," by Henry S. Carhart, professor of physics, and George W. Patterson, assistant professor of physics, University of Michigan. Cloth, 344 pages, 142 illustrations. Boston, Allyn & Bacon, 1895. Price, $2. Sent postage free on receipt of price by the ELECTRICAL REVIEW Publishing Company, 13 Park Row, New York.

The authors have presented a laboratory manual which is thoroughly up-to-date and embraces practical examples of the application of the latest current-measuring devices. Quantitative experiments only have been introduced, and these have the object of illustrating general rather than specific methods of measurement. Zero methods have been adopted wherever possible, and the student is advised to use them. The standard cell is considered of great importance in making measurements, and it has been described in detail and a large number of experiments involving its use are given. It is assumed that the student who uses this manual understands the first principles of physics and has some knowledge of analytic geometry and the calculus.

The Phonograph Helps to Cure a Diseased Pump.

To those people who look upon the phonograph as a scientific toy this story will be of interest, and it will be none the less so to those who know of the practical purposes to which this remarkable instrument can be put, says the New York *Tribune*. It appears that the Knowles Pump Works put up one of their large pumps for the Ricks Water Company at the Elk River pumping station in California. The pump was in constant use for some years and the makers heard no complaint until a few weeks ago, when they received a novel communication from H. L. Ricks, the manager of the pumping station.

There was no doubt in the minds of those at the station who were best acquainted with the mechanism that something was wrong with the pump, but they were unable to fix on the defect, and as the dismemberment of the pump would involve much loss of time, and as a visit by an expert from the East would mean a considerable expense, the phonograph was resorted to. The manager spoke into the receiver, describing the symptoms of the ailing pump, and further, to indicate the case, he placed the receiver so that the pulsations of the pump would be recorded on the cylinder.

Just as a physician listens to the action of the heart or lungs in the human body by means of a stethoscope, so the pump doctor listened by means of a phonograph to the throbs and pulsations of the pump thousands of miles away, and was enabled by that means to diagnose the disease.

A *Tribune* reporter listened to the strange communication at the New York office of the Knowles company. The voice of the Californian is heard first giving in a clear, precise and distinct way, the symptoms of the pump, and then he asks the listener to pay attention to the pump's action. Then one hears the b-r-r-r-bang! b-r-r-r-bang! of the pump and an occasional wheezing sound which might be made by escaping steam.

The engineer to whom the phonograph was submitted said that the whole record was so perfect and the speaking so plain that he felt tempted sometimes to interrupt and ask additional questions.

The experiment proved absolutely successful, and by means of the roll the disease was diagnosed. The proper remedy was suggested, and the pump is running once more "good as new."

Writer's Cramp Cured by Electricity.

The New York *Medical Journal* reports the cure of a case of writer's cramp in a telegraph operator by applications of static electricity.

The M. & B. Telephone in the Manufacturers' Club, Philadelphia.

Since the United States Telephone Construction Company, of Philadelphia, has had the M. & B. telephone on the market they have gotten out a good many designs and instruments for interior use. The accompanying illustration shows one type, known as Style E, which is in use in the Manufacturers' Club, Philadelphia. This club have recently acquired property adjoining their club house and fitted it up into parlors and bachelors' apartments. There are 17 rooms, each of which is supplied with one of these Style E, M. & B. telephones. In the cashier's office downstairs there is a needle annunciator, manufactured by the Partrick & Carter Company, of

M. & B. TELEPHONE IN THE MANUFACTURERS' CLUB, PHILADELPHIA.

Philadelphia, to which are added telephone connections and a fire alarm system. In each of the Style E telephones is placed a fire alarm bell. The telephone measures four and one-half by six and one-half inches, and is three and one-half inches deep. It is made of polished oak finished with a black rubber face and nickel trimmings. All the batteries of this system are in the basement, and it is so arranged that any of the rooms can communicate with the office, or intercommunication can be effected between any points desired. The annunciator is in the hallway by the cashier's desk, where there is always some one in attendance. The service given by this arrangement is extremely satisfactory, and combining as it does a fire alarm system with the telephone system, makes it doubly valuable. In case fire should be discovered, any employé can go to the annunciator, open a little door in front and pull out a plug which releases the clockwork mechanism and starts the fire alarm going. This rings all the bells throughout the house, so that the system insures both convenience and safety to the occupants of the club.

Why Were Not Means of Resuscitation Tried on This Man, Mr. Neftel?

The New York *Sun*, of September 18, reported the following accident:

James Dalton, a lineman, employed by Contractor Knight Neftel, who has just built the Southern Boulevard branch of the Union trolley road, was killed yesterday afternoon by falling on a feed cable at Southern Boulevard and Westchester avenue.

Dalton was sent up on a pole at that corner to tighten one of the cross wires which support the trolley wires proper. With a pair of pincers he was fastening the wire to the pole, when he was seen to throw up his hands and grasp at random for support.

His right hand closed on the feed wire, a big cable. Five hundred and fifty volts of electricity were passing through the cable at the time. The shock threw him forward and he fell with his abdomen across the cable.

His clothing and body were burned and he died in a few minutes. His body was taken to the Tremont police station, where it was claimed by his brother. William Dalton was 27 years old and leaves an aged father and mother in Connecticut.

It is extremely unusual for a railway current of 550 volts to have a fatal effect. The man must have been allowed to be in contact with the live wire for considerable time. In these days there is no excuse for not trying the means of resuscitation which are familiar to every sensible electrical worker.

MOONLIGHT SCHEDULE FOR THE UNITED STATES.

[*Issued by the National Carbon Company.*]

OCTOBER, 1895.

Day of Mo.	Light.	Day of Mo.	Extinguish.	No. of Hours.
	H.M.		H.M.	H.M.
1	A. M. 1.40	1	A. M. 5.10	3.30
2	" 2.40	2	" 5.10	2.30
3	No light.	3	No light.	....
4	No light.	4	No light.	....
5	No light.	5	No light.	....
6	P. M. 5.50	6	P. M. 7.30	1.40
7	" 5.50	7	" 8.10	2.20
8	" 5.50	8	" 8.50	3.00
9	" 5.50	9	" 9.50	4.00
10	" 5.50	10	" 10.50	5.00
11	" 5.50	11	" 12.00	6.10
12	" 5.50	13	A. M. 1.00	7.10
13	" 5.50	14	" 1.10	7.30
14	" 5.40	15	" 2.30	8.50
15	" 5.40	16	" 3.50	10.10
16	" 5.40	17	" 5.40	12.00
17	" 5.40	18	" 5.40	12.00
18	" 5.40	19	" 5.40	12.00
19	" 5.40	20	" 5.40	12.00
20	" 5.40	21	" 5.40	12.00
21	" 6.00	22	" 5.40	11.40
22	" 7.00	23	" 5.40	10.40
23	" 8.00	24	" 5.40	9.40
24	" 9.20	25	" 5.40	8.20
25	" 10.30	26	" 5.40	7.10
26	" 11.00	27	" 5.40	6.40
27	" 11.30	28	" 5.40	6.10
28		29	" 5.40	5.10
29	A. M. 12.30			
30	" 1.30	30	" 5.40	4.10
31	" 2.30	31	" 5.40	3.10
	Total			194.40

Correspondence School of Technology.

The Correspondence School of Technology, of Cleveland, O., has been incorporated, additional capital has been obtained and the following officers have been elected: E. P. Roberts, president; Thomas Robinson, treasurer, and J. C. Gallup, secretary. The new catalogue of the school will soon be issued and the future of the institution looks very encouraging.

Cars were run over the extension of the tracks of the New Haven & Centerville electric road for the first time on September 5.

NEW YORK STREET RAILWAY ASSOCIATION.

(*Continued from page 171.*)

but as yet none have been able to compete with electricity in economy and efficiency. However, we are ready to accept any innovation the ever-busy inventor may produce by which we can reduce the cost of operation.

Our association has a very useful future before it. The street railway of the State has assumed such a magnitude that questions of vital importance affecting its interests are continually arising. These important issues can be met with advantage both to the public and ourselves only by united and harmonious organization, and I think we all recognize the benefits arising from a general exchange of ideas and plans.

Through the association, during the past year, I have frequently had occasion to address you regarding the affairs of the association and I desire to thank you for the hearty and prompt response you have always accorded me by wire, mail or in person.

A brief abstract of the executive committee's report is as follows:

As a result of determined effort on the part of officers of this association the present membership is the largest in the history of our organization, comprising 39 members. The following companies have united with the association since our last annual meeting: Kingston City Railroad Company, Olean Street Railway Company, Rome City Street Railway Company, Newburgh Electric Railway Company, Pelham Park Railway Company, of City Island; Citizens' Street Railway Company, Fishkill-on-the-Hudson; Lock City Street Railway Company, Lockport, N. Y.; Ogdensburgh Street Railway Company; Hoosic Railway Company, of Hoosic Falls, N. Y., and Ulster County Electric Railroad Company, of Kingston. There has been but one withdrawal from our ranks during the past year of one road, namely, the Union Railway Company, of New York.

The growth and development of the association during the past year is most encouraging, and should stimulate renewed effort on our part to induce all of the street railroad companies of this State to become identified with us, thereby placing our organization foremost among the various State street railway associations of the country, a position to which it is justly entitled.

A number of amendments to the constitution were made providing for a division of the membership into active and associate members. Considerable work was done in regard to attempted legislation, which, if not counteracted, would have been very disadvantageous to the street railways of the State. Fifteen street railways in the State were granted permission to use electric power during the year. A tribute was paid to the memory of the late W. J. Richardson, secretary of the association, who died on April 26, 1895.

The report of the treasurer was read, which showed the following financial transactions during the year:

Receipts.....	$7,286.57
Expenses.....	6,299.76
Balance....	$986.81

On motion, approved.

The subject of the first paper was "Are We Laying Too Many Miles of Track to Reach a Few People?" It was read by the author, Mr. W. W. Cole, of Elmira, and on motion was received with thanks.

Mr. H. S. Newton, of Syracuse, read a paper on "Economical Equipment and Operation of Power House," which on motion was received with thanks.

The President: This paper is entitled to a thorough discussion.

Mr. Ostrom: I would ask if the vertical type of engine gives the same facility for examination by the manager. Mr. Newton has a good engineer, a man with brains, as he says, which many companies lack. I have heard in my travels quite severe strictures made on the vertical type of engine on the ground that the engineer will not go up and down stairs to oil it, and the manager in passing through the room has difficulty in seeing if the work is being done properly, as well as he could with the horizontal engine.

Mr. Newton: I can only say in regard to that, if you should have a lazy engineer, that the objection holds most decidedly; but with the class of men we are employing at present we have had no trouble at all, but for several years it has been my practice in my visits to the power house to go up on the decks of the engines—the decks of the three engines are all connected—and walk through and pay some attention to the lubricator, and I generally use my ears. At first we had a cheap man to begin with, and we had some very serious trouble at the outset; but since the present man has been in charge we have had very little to complain of; and as far as the facilities are concerned for the manager to go over the plant, it also requires a manager who is not lazy.

Mr. McNamara: I would like to know how many cars they are able to move in Syracuse with 13 tons of coal; also what the pay of the engineer and fireman is. I know you have one line with a pretty stiff grade.

Mr. Newton: We have one line which has some very severe grades. One grade which is an eight per cent grade, with a curve thrown in. We are running about 38 cars on that amount of fuel.

Mr. McNamara: What are the wages?

Mr. Newton: The wages are, chief engineer, $100 a month, which we consider very good pay in our section. (Applause.)

Mr. McNamara: How many hours?

Mr. Newton: He runs 12 hours; we have two shifts.

Mr. Rogers: What is the price of coal; what does that 13 tons mean in dollars and cents?

Mr. Newton: $2.25 a ton.

Mr. Barnard: Does not the use of the surface condenser lead to foaming in the boilers? How much does the use of the surface condenser save in the water tax?

Mr. Newton: We do not have any foaming; we had some at first, but that has disappeared.

Mr. Barnard: About how much saving does the utilization of about 90 per cent of your feed water amount to? In a great many cities the water rents are quite a large item, and when you avoid using 90 per cent of city water it ought to effect quite a saving.

Mr. Newton: We should not use city water; we use it from the Erie canal, which flows past the station. It is seriously impregnated with salt, and it is more on account of that than anything else that we adopted the surface condenser. You understand that the exhaust from the engines runs through this surface condenser, and is condensed into water; that water is pumped through a filter (an auxiliary filter) with these compartments in it that I speak of, direct into the boilers through a pipe heater, and we obtain from the hot well very warm water in the first place, and we really require very little heating capacity in the heater.

Mr. Barnard: Does the injector handle the feed water at the temperature it is used in the hot well without trouble?

Mr. Newton: That is one of the points in which our station is lacking; we have no injector. My former practice, however, would lead me to think it would feed it all right from the hot well without any of it going through the heater.

Mr. Cahoon: I would like Mr. Newton to give the steam pressure at which he operates and the make of the boiler?

Mr. Newton: We are operating at 110 pounds, at present. The boilers are built for 120 pounds pressure. We started out with the expectation of using 100 or 110 pounds, and when the demands of the load made it necessary, to increase our pressure to 125. The make of the boiler is the marine tubular boiler, made by the Cleveland Ship Building Company, Cleveland.

Mr. Cahoon: I think, possibly, in regard to coal, that the steam pressure has a good deal to do with the class of coal to be used. We made a long series of experiments on the use of various forms of anthracite and bituminous coal. We are using 160 pounds pressure, with compound condensing engines for the railway and triple expansion for lighting, and we found that the Eureka Clearfield coal gave the best results. That costs us two dollars a ton.

Mr. Rogers: Where is your plant located?

Mr. Cahoon: Elmira. We get our power from the lighting station; the railway and lighting company are both owned by the same parties. We get perhaps an advantage from the union of the two interests.

The President: A comparison of the cost of fuel would undoubtedly be interesting, as this is an important factor in the consideration of the subject.

Mr. McNamara: In the case last cited the gentleman gets his coal at $2, which would cost us $3.25 in Albany; not less than $3, certainly. Buckwheat anthracite in Syracuse is $2.25; we cannot buy it as cheap as that.

Mr. Clark: We use, in Binghamton, what we call bird's eye coal. It is a size smaller than buckwheat, washed clean and bright. We have been using that with a high degree of success; it costs $1.65, gross, f. o. b.

Mr. Cahoon: We made most of the experiments with bituminous coal, because operating at that high-pressure and having vertical tubular boilers, we found our anthracite coal fired badly and did not give good results. We tried various forms of bituminous coal, many of them from the Clearfield district. I think the cheapest grade was $1.60, but we did not get anywhere near as good results as the Eureka at a higher price. We get it landed in the bin at $1.95, and it costs us about five cents more to get it to the fire room, because we have to carry it in a cart some little distance.

Mr. Rogers: What does it cost you for fuel, Mr. McNamara?

Mr. McNamara: We pay $2.50. We can operate 50 cars at about the same coal consumption, but not as cheaply, because we have to pay more. Our power-house pay-roll costs us more than in Syracuse, as we have eight-hour watches. We do not pay as high wages, but employ more men.

Mr. Cahoon: I would like an expression as to actual cost per kilowatt hour, if any gentleman has it figured out. The cost of power delivered to the line, per kilowatt hour. I have some figures from several stations out West and through various portions of the country, and the cheapest that I could see was one and one-half cents per kilowatt hour, which came from Toledo. That is the cost delivered on the line.

Mr. Rogers: In Binghamton I think our coal cost $4.70 a day in June, and something over $6.00 a day in July, to operate anywhere from 20 to 30 cars. We take our water from the river. We have our grates arranged so that we can use dust mixedwith buckwheat and bird's eye.

Mr. Norton: How many tons a day for the 20 cars?

Mr. Rogers: I did not get the tonnage; the value of the coal was as stated.

Mr. Clark: The average was about eight tons; about 60 per cent dust and 40 per cent coal; averaged about 27 cents in the yards.

Mr. Cahoon: What kind of boilers?

Mr. Clark: Horizontal.

Mr. Cahoon: Operating at 100 pounds pressure?

Mr. Rogers: Our boilers were specified to carry 125 pounds steam; we use them at 110 pounds steam.

Mr. Newton: I would like to ask Mr. McNamara if you have any unbonded track on the line, or any poor flat rail?

Mr. McNamara: Not that we know of. (Laughter.)

Mr. Newton: The reason I ask is I think we get good results under the circumstances. About half of our mileage is old flat horse car rail, and we have never attempted to bond it. We did not think it was fit to bond and have run an overhead rail feed along on the poles and tapped in every now and then, and the result is there is a large amount of power lost in the ground; and that is the only

ground on which it is possible for me to account for the increased economy in your station over ours.

The paper by Mr. Benjamin Norton, of Newburgh, "Is a Freight or Mail Service Profitable or Unprofitable on Street Railways" was then read. The paper was received with thanks.

Mr. Meiklehan: I would ask the gentleman how he arranges to collect his freight, without interfering with his passenger traffic?

Mr. Norton: If you were running cars on four-minute headway probably there would be some trouble, but where we run once an hour, between Newburgh and Walden, we have ample time, particularly as the line runs through the main street, and the stores are all located on that street. It never interferes with the passenger service. We have a general freight house in Walden, with a siding, where freight is delivered during the day. We have our freight trains arranged on a regular schedule and some of it is collected along the line of the road. Of course, a great deal of it is delivered at the freight houses.

Mr. Meiklehan: You say, if it does pay, it pays. Do you not think that the line is drawn at the point of the ability of the road to deliver and receive? In 1888 a road in Norristown undertook to do that work and made a great deal of money out of the freight service, but the trouble came in at the point of delivery. We were expected to take a package to anybody along the line, and its delivery might require skids to get it to the door, and the delay was found to be very annoying. If we could have certain points at which to take up and deliver freight, we could put in sidings, and the matter would be simplified.

Mr. Norton: Most of our freight is sent through from one point to the other. We have comparatively little intermediate freight in the 12 miles between the two points. Most of the firms who send their freight are within easy reach of the freight houses, so that we have not had any inconvenience in receiving or delivering freight.

Mr. Meiklehan: That is the question, whether you can get such freight in sufficient quantities.

Mr. Cole: Have you made any arrangements for carrying letter carriers at a cheap rate?

Mr. Norton: We have not taken the matter up largely with the post office. There happens to be one instance that I think of where we do transport the mail carrier, on a route which is perhaps a little longer than the average—out to West Newburg. We let him ride both ways free, two round trips each day, to collect and deliver mail.

Mr. Cole: Some years ago I was connected with the Utica belt line road, and we made arrangements not only to carry the mails, but received a stipulated sum for transporting the mail carriers. It cost about three cents a man.

Mr. Norton: We had that arrangement in Brooklyn. It is in vogue now. The fare was three cents. I understand it is four cents now.

Mr. Cole: At Utica we carried a sign on all the cars, "U. S. Mail," whether we had it on the car or not.

Mr. Norton: You were authorized to carry the mail on your system?

Mr. Cole: Yes.

Mr. Norton: There is no question about the right to carry the signs. We had in Brooklyn two cars arranged like the regular railway mail post office, on the long line to Coney Island. We had a side track into the General Post Office in Brooklyn; the mail was put into the cars, and the mail clerks went along and distributed it; and they picked it up and sorted it in the car and delivered it at various stations. The west end division of the Atlantic avenue system was formerly a steam road, and they had a regular government contract to carry the mail. When we changed it over to electricity we carried on the contract. I do not think there is any other road, unless it is in St. Louis, where the service is performed in that way, as a regular railway mail post office. Many of the cars in most cities are allowed to carry signs simply to pick up mail bags and move them from point to point, but in Brooklyn the mail is regularly sorted in cars on the road.

Mr. Cole: I think it is so in Boston.

Mr. Ostrom: Also in Philadelphia.

Mr. McNamara: We have been operating for over a year a freight line between Albany and Troy—an inter-urban freight line. We have a freight house in Albany and one in Troy. We do not aim to take up packages on the way. It is a through freight line. We have been operating it for a year and are going to continue.

Mr. Norton: Have you any special provision in your franchise which authorizes you to carry freight?

Mr. McNamara: We are operating this freight line on a leased line, which was chartered to do it, otherwise we could not do it.

The paper by Mr. J. F. McElroy, of Albany, on "Car Heating by Electricity," was read by him, and on motion was received with thanks.

The paper by Mr. C. Loomis Allen, of Syracuse, on "General Track Construction," was read by him. The paper was received with thanks.

Mr. J. H. Barnard, of New York, read his paper on "Signals on Electric Railroads." The author was thanked by vote.

There was an animated discussion on the subject of the admission of supplymen as associate members, in which a number of representatives of supply houses participated, opposing the idea, on the ground that it would not tend to the welfare of the association. The matter came up in the form of an amendment to the by-laws, which was not adopted.

Mr. Norton moved a rising vote of thanks to President Rogers for the successful efforts he had made during the year in bringing the association up to its present high standard.

The motion was unanimously adopted.

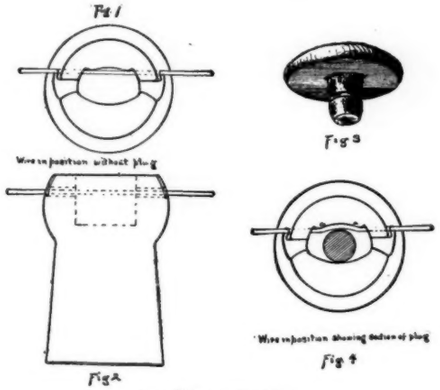
A vote of thanks was tendered to Mr. J. P. E. Clark, of Binghamton, for his efficient services as temporary secretary.

The president appointed Messrs. Norton, Cole and Cooper a committee to nominate officers for the ensuing year.

The attendants at the meeting were photographed in front of the Y. M. C. A. building. In the afternoon they visited the Capitol and other places of interest in the city, and made an excursion to Troy, under the auspices of the Albany Railway.

In the evening there was a banquet at the Hotel Kenmore, which was well attended and was a very successful affair. At its conclusion three cheers were given for Mr. John W. McNamara, treasurer of the Albany Railway, for his efforts in the entertainment of the visitors.

An interesting exhibit was made in a room adjoining the meeting hall; and the meeting was unanimously considered the most successful in the history of the association, both in point of attendance and the interest manifested in the business proceedings.



THE NOTI INSULATOR.

The following officers were elected for the ensuing year: President, G. Tracy Rogers, Binghamton; first vice-president, W. W. Cole, Elmira; second vice-president, John H. Moffitt, Syracuse; secretary and treasurer, Benjamin Frick, Brooklyn. Executive Committee, H. H. Vreeland, New York; John W. McNamara, Albany; Henry M. Watson, Buffalo.

The meeting adjourned to meet in Binghamton on the second Tuesday in September, 1896.

The following-named gentlemen were in attendance:

REPRESENTATIVES OF STREET RAILWAY COMPANIES.

Allen, C. L., Syracuse St. Ry. Co., Syracuse.
Bissell, Charles J., Rochester Ry. Co., Rochester.
Cahoon, J. B., Supt. Elmira and Horseheads Ry. Co., Elmira.
Cole, W. W., Supt. Elmira St. Ry. Co., Elmira.
Clark, J. P. E., Gen. Man'r., Binghamton St. Ry. Co., Binghamton.
Cleminshaw, Charles, Pres. Troy City Railway Co., Troy.
Cooper, H. S., Supt. Schenectady St. Ry. Co., Schenectady.
Everts, Frank L., Supt. Utica & Mohawk Ry. Co., Utica.
Frick, Benjamin, Sec. and Treas. Atlantic Ave. R. R. Co., Brooklyn.
Havens, William E., Supt. Fishkill St. Ry. Co., Fishkill.
McKeever, R. T., Supt. Johnstown St. Ry. Co., Johnstown.
McNamara, John W., Treas. Albany Ry., Albany.
Meiklehan, T. M. R., Supt. B., Q. C. & S. Ry. Co., Brooklyn.
Morgan, Godfrey, Manager Amsterdam St. Ry., Amsterdam.
Norton, Benjamin, Pres. Newburgh Ry. Co., Newburgh.
Newton, H. S., Elec. Eng. Syracuse St. Ry., Syracuse.
Rogers, G. Tracy, Pres. Binghamton St. Ry. Co., Binghamton.
Rusling, F. O., Supt. Buffalo Ry. Co., Buffalo.
Smith, Charles H., Supt. Troy City Ry., Troy.
Stedman, J. H., Transfer Dept., Rochester Ry. Co., Rochester.
Storey, C. B., Sec. Hoosick Falls St. Ry. Co., Hoosick Falls.
Vickers, Albert, Elec. Syracuse Cons. St. Ry. Co., Syracuse.
Wardwell, John S., Pres. Rome City St. Ry. Co., Rome.

ALLIED INTERESTS.

Allison, Giles C., St. Louis Register Co., St. Louis.
Barnard, J. H., Interior Telephone Co., New York.
Barrett, Charles E., Hale & Kilburn Mfg. Co., Philadelphia.
Brady, Paul T., Westinghouse Co., Syracuse.
Cockey, Marston R., Roebling's Sons Co., New York.
Delaney, William H., New York.
Dutton, W. D., Doerner & Dutton, Cleveland.
Estep, F. A., Nuttall Co., Allegheny.
Evans, H. C., Johnson Co., New York.
Everts, D. T., Simplex Co., New York.
Ewing, Geo. C., electric specialties, Boston.
Fowler, F. H., Bemis Car Box Co., Springfield.
Ham, W. F., Johnson Co., New York.
Hanna, J. A., McGuire Car Truck, New York.
Lawless, E. J., American Car Co., St. Louis.
Long, E. G., Peckham Motor Truck and Wheel Co., New York.
MacDuffie, R. L., Taunton Loco. Mfg. Co., Taunton.
McElroy, J. F., Cons. Car Heating Co., Albany.
Medbery, H. J., Overhead Equipment, Mechanicsville.
Mercur, R. J., New York Car Wheel Co., Buffalo.
Morse, George C., Rochester Car Wheel Co., Rochester.
Newkirk, H. R., Hoafgen, Moxham & Co., New York.
Ostrom, John F., Pennsylvania Steel Co., Philadelphia.
Packer, E., St. Louis Register Co., New York.
Pugh, D. W., Stephenson Co., New York.
Pugh, John S., Stephenson Co., New York.
Robert, Louis E., Johnson Co. New York.
Rose, R. M., Hughes Register Co., New York.
Russell, F. D., Rochester Car Wheel Co., Rochester.
Sharpe, D. W., Newark, N. J.
Silver, William S., Graduated Car Spring Co., New York.
Vosburgh, A. C., New Process Raw Hide Co., Syracuse.
Wallace, J. E., Smith & Wallace, Boston.
Wardwell, F. S., Electric Railway Construction, Danbury.
Wardwell, V. P., Electric Railway Construction, Danbury.
Washburn, William A., Cambria Iron Co., New York.
Wood, Charles N., Nuttall Co., Boston.
Yates, F. A., Trendley Brake Co., St. Louis.

Among the technical press men were Mr. S. H. Goddard, of the ELECTRICAL REVIEW; Mr. Jas. H. McGraw, of the *Street Railway Journal*, and Mr. T. C. Martin, of the *Electrical Engineer*.

The Noti Insulator.

The accompanying illustration shows a new form of insulator for which a patent has been granted to Albert Vickers and Wm. Dibb, of Syracuse, N. Y. The insulator is designed to do away with tie wires and is extremely simple. The idea to aim at in effecting a perfect support, for any wire is to prevent its coming in contact at the insulator with anything that could injure it in consequence of the constant movement that exists there owing to swinging in the wind of the wires and working of the poles. It is a well-known fact that the tie wires sometimes injure the line permanently, and are often a source of broken and crossed lines. In overcoming these difficulties in the insulator here described the idea has been to support and fasten the wire and yet have it in contact with nothing but smooth rounding surfaces of glass or porcelain which could not possibly in any way injure it. The insulator consists of a body of the present form screwing to the pin with the top part provided with a cavity shaped as shown in Fig. 4. It will be seen that the roller action of the plug prevents the wire from moving laterally, the plug keeps it from flying up, and it is therefore securely fastened. The plug cannot come out, for the pressure of the wire against a slight groove in it holds it to its place securely enough, as there is no strain on it tending to force it out. In addition to the advantages already cited, this insulator has the following points to recommend it. It fastens the wire more positively than a tie and all corrosion is avoided. It is used more easily and quickly than a tie and can be fastened very much more quickly. This saves time and money in constructing lines and the results are bound to be more satisfactory as every fastening is uniform and is readily inspected from the ground, since if the plug is in position the fastening is all right. It is evident therefore that broken wires and crossed lines will be at a minimum on lines where this insulator is used, to say nothing of the very much less time required to construct a line with them. This insulator is being put on the market by the Noti Insulating Company, of Syracuse, N. Y., and is made for any size wire.

ADVANCE INFORMATION.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

New Electric Railways.

CANTON, Mo.—There is strong talk of building an electric road from Canton, Mo., *via* Monticello, Williamstown, Fairmont, Wyacondato and Memphis. Hon. F. L. Marchand, Monticello, Mo.; Hon. Ed. R. McKee, Memphis, Mo., and Judge George Elleson, Canton, Mo., are the leading spirits and will correspond.

NEW ROCHELLE, N. Y.—The Southern New York Railway Company, to operate a street surface railroad for a distance of one mile in the village of New Rochelle, Westchester county. Capital, $10,000. Directors, Alanson T. Enos, of Englewood, N. J.; Joseph S. Tracy, of Larchmont; Charles F. Tracy, of Fordham; Edward F. Thayson, A. Phillip Stanford, Franklin Paddock and Robert B. Wade, of New York city; George P. Morgan, of New Rochelle, and Henry F. Gove, of Brooklyn.

FORT WAYNE, IND.—Fort Wayne & Hicksville Electric Railway Company has been incorporated with a capital stock of $50,000.

KINGSTON, N. Y.—Ulster County Electric Railway Company has been incorporated by Charles A. Johnson, Frederick A. Reed, Raymond C. Johnson and others, of New York, and W. T. Tiers, of Philadelphia, Pa. Capital stock, $100,000.

NEWARK, OHIO.—R. W. Evans and A. Patterson have been granted franchise to build an electric road to Hebron.

CARTHAGE, Mo.—An electric line is to be built from Nevada and finally extended to Kansas City and Sedalia.

HILLSBORO, ILL.—An electric railroad is to be built between Litchfield and Hillsboro.

ZANESVILLE, OHIO.—An electric railroad is to be built between Zanesville and Columbus.

COHASSET, MASS.—An electric road is to be built from Cohasset to Braintree.

PORTLAND, ORE.—The Portland & Western Railway Company, in which S. Z. Mitchell, Fred. V. Holman and W. F. Nelson are interested, will build an electric road to Hillsboro. Capital stock, $50,000.

WINDSOR LOCKS, CONN.—Steps are being taken to build a street railway line from Windsor Locks to Poquonnock.

MOBILE, ALA.—The Mobile Railroad Company, of which J. C. Morris is president, has decided to make an extension of its electric line into western suburbs.

ASBURY PARK, N. J.—Asbury Park & Belmar Street Railway Company has filed articles of incorporation with the Secretary of State for a double track electric railway from Asbury Park to Belmar.

BOSTON, MASS.—The Reading & Lowell Street Railway Company has been incorporated by Charles F. Woodward, Henry H. Savage, Silas W. Flint, of Wakefield, and others, to build an electric railway to connect Boston and Lowell. Capital stock, $50,000.

TOLEDO, OHIO.—An electric road is to be built from Toledo into Michigan. The right of way has been secured and $50,000 subscribed.

BENNINGTON, VT.—The Bennington Electric Railroad was organized by the election of the following directors: A. B. Valentine, E. E. Larrabee, I. E. Gibson, J. A. Powers, E. L. Sibley.

MANSFIELD, OHIO.—A movement is on foot to construct an electric railroad from Mansfield to Plymouth.

WASHINGTON, D. C.—The company interested in the proposed line between Washington and Forest Glen is now securing right of way. Benjamin F. Leighton is interested, and may be addressed for information.

SAVANNAH, GA.—The Suburban & West End Railway Company, of which James H. Johnston is president, has decided to build an extension one mile long to its trolley lines.

PUEBLO, COLO.—The Pueblo Electric Street Railway Company has been incorporated by A. E. Pattison, Elmer E. Whitted, Anthony C. Campbell, Irving Hall and Frank B. Gibson, for the purpose of acquiring and operating an electric street car line in Pueblo. Capital stock, $500,000.

KEENE, N. H.—It is reported that this place will have an electric railway at an early date.

OSWEGO, N. Y.—The Oswego street railroad has been sold to George N. Burt and George Hart, who will manage the property. Mr. Burt was elected president of the road and Mr. Hart secretary.

SOUTH FRAMINGHAM, MASS.—A franchise has been granted for an electric railway from here to Holliston.

GREENFIELD, MASS.—The capital stock of the Greenfield & Turner's Falls Street Railway Company has been increased from $50,000 to $60,000. The Montague Street Railway Company has also increased its capital from $40,000 to $50,000. These two companies may consolidate.

NORWOOD, MASS.—Petitions for an electric railway between here and Dedham have been signed.

RICHFIELD SPRINGS, N. Y.—The trustees of Richfield Springs have refused to grant the application of the proposed Little Falls & Richfield Springs Electric Railroad Company to enter this village.

ALLENTOWN, PA.—Work on the Allentown & Reading Electric Railroad has been commenced in this city. It is to be completed to Kutztown by next Spring.

BELLAIRE, OHIO.—It is reported that the Second Avenue Traction Company, of Pittsburgh, is negotiating for the purchase of the Wheeling railway of this city and also the Bellaire, Bridgeport & Martin's Ferry road on the Ohio side of the river. It is said the Second Avenue line proposes to extend its Pittsburgh line so that a connection may be had with this city. It comes from a semi-official source that the road will cross the river at this point.

TOLEDO, OHIO.—The Toledo & Petersburg Railway Company, capital, $200,000, has been incorporated by John O. Zabel, Petersburg, Mich.; Willis Baldwin, Monroe, Mich.; Geo. F. Wells, W. F. Coon and Clyde Coon, of Toledo. Mr. O. S. Bond is practically in charge of the Toledo end of the proposed road, and will represent its local interests.

BRAZIL, IND.—J. D. Sourwine has been refused a franchise for an electric railway by the county commissioners.

GOSHEN, IND.—The electric railroad will be extended to Elkhart. The construction will admit of heavy freight traffic.

BELVIDERE, ILL.—It is reported that electric cars will be running here before July 1, 1896. John M. Roach is interested in the project.

RICHMOND, IND.—The street railway plant has been sold for $50,100 to S. A. Fordyce, of St. Louis, representing the bondholders of the road.

Electric Light and Power.

BROOKLYN, N. Y.—The Brooklyn Union Gas Company has been incorporated by George W. Young, Frank B. Schley, John T. Mills, Jr., and others of New York city; George Turnbull, of Brooklyn, and Watson B. Dickerman, of Mamaroneck, to supply gas and electricity. Capital stock, 15,000,000.

VAN BUREN, ARK.—H. J. Isbel, of Parsons, Kas., has been granted a 15-year franchise to establish electric light and power plant.

PUNTA GORDA, FLA.—The Punta Gorda Ice and Power Company has been organized by J. H. Farrington, William S. Steston, and Lorenzo T. Blacksom for the purpose of manufacturing ice and electric light and power. Capital stock, $10,000.

BALTIMORE, MD.—The Chesapeake Electric Water Company is erecting a new boiler and power house at a cost of $15,000.

CANTON, MISS.—The Southern Electric Supply Company, of New Orleans, has been awarded contract for the electric light plant and water system.

MORRISTOWN, TENN.—The Morristown Electric Light Company has been incorporated by John K. Shields, R. E. L. Mountcastle, George A. Crouch and W. H. Faine, Jr.

MADISON, WIS.—The People's Electric Company has been incorporated by L. E. Kerns, F. H. Ford and L. W. Kroncke. Capital stock, $10,000.

LEE, MASS.—The Lee Electric Company will furnish power for manufacturing purposes if enough subscribers can be secured to make the additional plant pay.

SMITHVILLE, TEX.—A company is being organized to build an electric light plant and construct waterworks.

VICKSBURG, MISS.—The Vicksburg Electric Light Company, which recently signed contract to light the city for five years, has purchased the necessary machinery and material to completely renew its plant and lines and to largely increase the capacity of its works.

BUENA VISTA, VA.—The Buena Electric Light and Power Company has contracted for the remodeling of its plant from steam to water power.

ASHEVILLE, S. C.—S. F. Chapman invites correspondence with makers of machinery for the reduction by electricity of bauxite to aluminum.

JOLIET, ILL.—The Joliet Light, Heat and Power Company has been incorporated by J. E. Sutherland, L. J. Highlands and J. S. Ward. Capital stock, $100,000.

KANSAS CITY, MO.—John P. Loomis has applied for a franchise for an electric light plant.

DES MOINES, IOWA.—The Great Western Light and Heating Company has been incorporated by A. E. Johnson, E. P. Thompson and G. W. Benedict. Capital stock, $250,000.

BATAVIA, N. Y.—The Aldermen have decided to purchase a 300-light dynamo to light the council chamber and the quarters of all the fire companies.

DAWSON, GA.—A New York firm has purchased $10,000 of electric light bonds from this town.

WATERTOWN, N. Y.—A $3,000 power house has been completed on Calumet Island, St. Lawrence River, by Charlebois Brothers, of Watertown, for Charles G. Emery, the millionaire cigarette manufacturer.

WESTBROOK, ME.—The Marsh Brothers, of Deering, have stopped furnishing electric lights for the streets of Deering, leaving the field of the Westbrook Electric Light and Power Company of this city.

ATHENS, GA.—The Athens Street Railway Company has let contracts for the construction of a water-power plant at Mitchell's bridge. Dynamos will be operated to furnish current for the railway and for industrial purposes in Athens.

New Telephone and Telegraph Companies.

DES MOINES, IOWA.—The Phœnix Telephone Company has been incorporated by Charles M. Waterbury, John W. Paris, Noah J. Cladfelter and others. Capital stock, $1,000,000.

SOUTH BEND, IND.—South Bend Telephone Company has been incorporated by Corwin D. Van Pelt and others. Capital stock, $50,000.

LIBERTY, N. Y.—The Delaware River Telephone and Telegraph Company, of Liberty, Sullivan County. To construct telephone lines through Sullivan, Orange, Ulster and Delaware counties in New York State, Wayne and Pike counties in Pennsylvania and Sussex County, New Jersey. Connecting Deposit, Hancock, Port Jervis, Honesdale, Milford, Middletown, Bloomingburgh, Wurtsboro, Ellenville, Grahamsville, Livingston Manor, Lew Beach, Roscoe, Trout Brook and Walton. Capital, $25,000. Directors, Charles Homer and E. H. Pinney, of Jeffersonville; George Christians, Wallace M. Kilburn and others, of Liberty, and John H. Schofield, of New York city.

CHESTER, PA.—Delaware County Telegraph and Telephone Company, of Chester. Capital, $25,000. To construct and operate a line in County and State of Delaware. Directors, Joseph Meesick, Joseph Deering, I. Engle Cochran, Jr., Henry V. Smith and Ward R. Bliss, Chester.

BELLEFONTAINE, OHIO.—The Bellefontaine Telephone Company; capital, $10,000; has been incorporated.

SAGINAW, MICH.—A franchise has been granted to the Mutual Telephone Company, who claim to have enough three-year contracts to oust the Bell company, and cheap service is looked for to those who have not signed with the new company.

NORTH ARGYLE, N. Y.—The North Argyle Union Telephone Company; capital, $250,000, to connect North Argyle and Argyle, Washington County, has been incorporated. The capital is to be divided into 50 shares. William D. Stevenson, Alexander S. Cuthbert, Rodney Van Wormer, Robert B. Scott, H. A. McEachron, William C. Cuthbert and Robert Cuthbert are the directors.

SUPERIOR, WIS.—The Standard Telephone Company is to enter Superior. A 30-year franchise has been granted to Capt. Ira Harris, late city clerk, his associates and assigns.

WEST SUPERIOR, WIS.—The Northwestern Standard Telephone Company has been granted a thirty-year franchise by the Common Council on the understanding that they compete with the present company and give cheaper rates.

MANCHESTER, N. H.—The Manchester Telephone Company, capital $125,000, has been incorporated. A. W. Worthly, of Boston, is president, and A. S. Haynes, of Boston, is treasurer. The incorporators are: A. W. Worthly, of Boston; George A. Leighton, of Manchester; A. S. Haynes, of Boston; W. H. Fairchild and G. W. Prescott, of Manchester, and J. T. Parsons, of Boston.

Business Troubles.

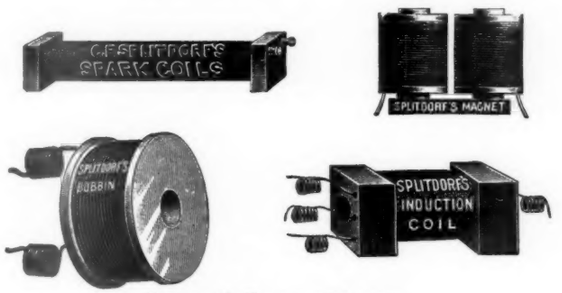
ORANGE, N. J.—The road of the Suburban Traction Company will be sold by auction here on October 14, to satisfy a mortgage of $1,500,000 held by the American Loan and Trust Company, of Boston, on which bonds were issued.

Niagara's Electric Plant.

A somewhat futile discussion has been going on between Prof. G. Forbes and others regarding the type of electric generators adopted at the Niagara works, says our London namesake. The plant, as everybody knows, is hardly yet started, nevertheless engineers, manufacturers and promoters connected with it are rushing into print and proclaiming the whole thing to be an unprecedented and prodigious success. It may be, and we sincerely hope that it will be, as great a success as these interested parties try to make it appear to be, but nothing in the designs or execution of the work, so far as we can gather at present, would lead us to assume that anything marvelously clever has been done to make this plant so very exceptional. In magnitude it is undoubtedly a great scheme, but the design of the generators and their construction are points about which a great deal of unnecessary boasting is going on; the low frequency of the alternating current employed is also held up for admiration. Now, whether this plant is to be a success or not can only be settled by lapse of time; the result of its continued operations and extension alone can definitely decide. The alternating current system in this case is possibly the best, but whether the machinery designed and erected for operati g the system is any advance upon previous plants is a question which electrical engineers have not yet had time to finally give a verdict upon; judging, however, from American made alternating plants at the Chicago exhibition we should scarcely expect the machinery to be superior to that of European manufacture. This is not the time for argument over the broad question of alternating versus continuous currents for Niagara. The former being adopted and now on its trial it is too late to discuss its adaptability and too soon to discuss its merits, hence we call the recent discussion futile. Some electrical engineers are still working away at high pressure continuous current machinery, and in the end it may turn out that Lord Kelvin's preference for continuous current is founded upon the best of reasons. The increased pressures at which incandescence lamps can now be worked, and the improvements in generators and motor generators steadily going on, has placed the relations between alternating and continuous current systems in quite a different light. The views held four or five years ago are greatly modified, and a continuous current system can at the present moment be considered applicable in cases where a few years ago it was out of the question.

Splitdorf's Magnets and Coils.

The illustrations presented herewith show several magnets and coils manufactured by C. F. Splitdorf, 17 to 27 Vandewater street, New York city. They are wound with Splitdorf's patented magnet wire, which is insulated with the very finest Sea Island cotton, and treated with a coating of a patented adhesive solution which is in itself a non-conductor of electricity. On top of this adhesive substance the cotton is woven, and when dry the insulation is perfectly hard and firm and not easily injured. The Splitdorf coils are very carefully made and guaranteed to be perfect, both as to insulation and resistance. Only the most skillful mechanics and winders are employed, which, together with the use of the best obtainable materials, insure first-class products.



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The Schuyler Electric Company, of Middletown, Conn., having voted to wind up its affairs and dispose of its property, and in accordance with the order of the Superior Court, of Hartford County, July 16, 1895, in the case of John Byrne *vs.* The Schuyler Electric Manufacturing Company, *et al.*, offers for sale the entire property of the company, consisting of land, buildings, etc., in the city of Middletown, Conn., the land being 116 feet on William Street and 171 feet on Hamlin Street, with a depth of about 275 feet, together with seven brick factory buildings thereon, including offices, engine and boiler house, blacksmith shop, dipping room, brass foundry, carpenter shops and sheds, together with three engines and two boilers having a capacity of about 350 horse-power; buildings fully equipped with elevators, sprinkler system, and steam heating system complete in every detail.

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The entire property will be sold at public auction at the works, unless previously disposed of at private sale, on the 15th day of October, 1895, at 12 o'clock noon. The terms of sale will be 10 per cent. cash at time of sale, and the balance in cash within 10 days upon delivery of deeds of the property. The property is subject to inspection and examination at any time.

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ELECTRICAL PATENTS

ISSUED SEPTEMBER 10, 1895.

546,232 Insulator, conductor and conduit for electrical wires and cables; W. R. Hitchcock, Cornwall, Canada.

546,233 Automatic electrical cut-out; C. C. Kritzer, Grand Rapids, Mich.

546,238 Electric igniter for gas engines; F. S. Mead, Montreal, Canada.—Comprises a fixed electrode and a movable electrode mounted eccentrically on an oscillating or revoluble shaft or journal.

546,247 Electric brake; W. B. Potter, Schenectady, N. Y.—A controlling switch for the electric motors, a brake switch, a reversing switch and means for preventing a simultaneous operation of any two of the switches.

546,261 546,262 Automatic electric fire-alarm; C. D. Tisdale, Boston, Mass.

ISSUED SEPTEMBER 17, 1895.

546,303 Trolley pole for railway cars; R. Crommer, Philadelphia, Pa.—A trolley arm provided with a wire finder.

546,324 Dynamo telegraphy; A. S. Harris, Minneapolis, Minn.—Two sets of contact points, each set being independently controlled by a lever, two sources of current of like potential but of opposite polarity connected to one set of contacts, and two other sources of current of different potential and opposite polarity connected to the second set of contacts.

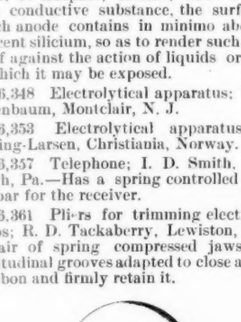
546,328 Anode for electrolytical apparatus; C. Hoepner, Giessen, Ger.—Consists of a conductive substance, the surface of which anode contains in minimo about 10 per cent silicium, so as to render such anode proof against the action of liquids or gases to which it may be exposed.

546,348 Electrolytical apparatus; W. A. Rosenbaum, Montclair, N. J.

546,353 Electrolytical apparatus; A. Sinding-Larsen, Christiania, Norway.

546,357 Telephone; I. D. Smith, Pittsburgh, Pa.—Has a spring controlled carrying bar for the receiver.

546,361 Pli-rs for trimming electric arc lamps; R. D. Tackaberry, Lewiston, Me.—A pair of spring compressed jaws with longitudinal grooves adapted to close around a carbon and firmly retain it.



No. 546,383.—INSULATOR.

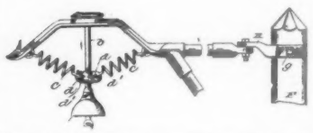
546,383 Insulator; G. Gerstenlauer, Williamsport, Pa.—The head of the insulator is bored through and from the outside a narrow slit is cut to said main hole, to allow a wire to be passed in sidewise, after which a plug is inserted to maintain the wire in position.

546,388 S. P. Parmly, Chicago, Ill.—A lamp mechanism adapted to feed the carbons, with two electrodes, each consisting of a sheet or plate of carbon in the form of two round carbons with a connecting portion.

546,389 Underground conduit for electric railways; H. A. Petersen, Milwaukee, Wis.

546,403 Arc lamp mechanism; K. A. Lantau; Chicago, Ill.

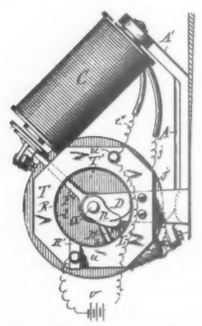
546,407 Trolley wire bracket; L. S. Pfouts, Canton, O.—An arched arm supported at right angles to the trolley wire by an arm secured to a pole and springs attached to said arched arm, and a trolley wire clamp located below the arched arm.



No. 546,407.—TROLLEY WIRE BRACKET.

546,417 Thermo-electric generator; H. B. Cox, Hartford, Conn.—A thermo-electric generator having its surface to be heated, comprised within and forming a part of an insulated fluid circuit or conduit, means to heat the fluid in said conduit and a propeller in said conduit for circulating the fluid therein.

546,442 Electric motor; F. H Williams, Greene, N. Y.—Motor magnets and their armature, a circuit-breaker consisting of an inferior supplementary magnet having its helix connected with the core and with the aforesaid motor-magnets, and an electrical contact finger carried to and from the core of the supplementary magnet by the aforesaid armature.



No. 546,442.—ELECTRIC MOTOR.

546,471 Connector for terminals of electric circuits; J. E. Neher, Pittsburgh, Pa.—A yielding resilient insulating support for one of said terminals, an unyielding, insulating support for the opposing terminal and means for clamping the said parts together.

546,475 Fuse block; H. N. Potter, Allegheny, Pa.—A fuse and a heating coil surrounding the same and in series therewith.

546,476 Electric converter; C. F. Scott, Pittsburgh, Pa.

546,483 Electro-depositing apparatus; H. L. Bridgman, Blue Island, Ill.

546,494 Insulating railroad joints for electrical signals; T. O'Brien, Jr., Philadelphia, Pa.

546,523 Lightning arrester and cut-out; O. Giesseke, Lake Charles, La.

546,534 Electric arc lamp; D. Higham, Boston, Mass.—An electric arc lamp having a suitable feeding mechanism with a carbon rod and clutch for same, and a spring or elastic stop for said clutch.

546,546 Electric railway; H. M. Montgomery, New York, N. Y.

546,551 Thermometric circuit-closer; R. Pierson, London, Eng.

546,553 Electric calculator; W. C. Porter, Arlington, Minn. — Consists of a series of dials each representing a different denomination and having numbers upon their faces corresponding to the places in each denomination, electro-magnets for each dial provided with armatures, each of which controls an indicating arm and means for turning the hands back.

546,560 Electric locomotive; S. H. Short, Cleveland, O.—An electric motor journaled in arms, journaled on the driving axle, and gearing connecting the armature shaft and axle, a cross bar yieldingly mounted on the truck frame, and a laterally swinging link for connecting one side of the motor casing and the cross bar.

546,579 Insulated electric conductor; Franz Clouth, Cologne, Ger.—A conductor, a covering layer of caoutchouc surrounding said conductor or wire and a layer of gutta-percha surrounding and inclosing the caoutchouc.

546,582 Electrical piano; G. H. Davis, New York, N. Y.—A revolving roller, a friction shoe pivoted above said roller and adapted to be brought into contact therewith, an electro-magnet arranged adjacent to and having its armature connected with the shoe, and a connection between the latter and the keys of a piano.

546,585 Insulator; W. Dibb, Syracuse, N. Y.—An insulator provided with a cavity in its upper end, similar opposite slots in the wall thereof to receive the line wire and a plug to kink the hole.

546,613 Electric fusible cut-out; D. N. Gleason, Brooklyn, N. Y.

546,625 Electric arc lamp; H. A. Seymour, Washington, D. C.

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